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Summer Session
1921

July 2—August 12

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This announcement is intended to give detailed information to prospective students in the Summer Session of Cornell University.

For general information concerning the University and the work in its various colleges during the academic year, the requirements for admission, etc., the General Circular of Information should be consulted. This and the other publications of Cornell University are listed on the last page of the cover of this pamphlet. Any one of the informational publications there mentioned will be sent gratis and post-free on application to the Secretary of Cornell University, Ithaca, New York.

CALENDAR

SUMMER SESSION 1921

In order to get the full number of exercises announced for the Summer Session it is necessary that all work begin promptly on Tuesday morning, July 5. Students are urged, therefore, to reach Ithaca in time to be present at the first exercise in each class. If possible, they should register on Saturday, July 2; if not, they should register on Tuesday during the hours not occupied in class work. Since instruction begins on Tuesday, all five-hour classes will meet on Saturday, July 9.

July	2, Saturday,	8 a. m. to 5 p. m. Registration, Room A, Goldwin Smith Hall.
July	5, Tuesday,	Instruction begins at times and places announced under each course. Registration continued at office of Registrar, Morrill Hall.
July	5, Tuesday evening, and following Tuesdays,	Organ Recital, Sage Chapel.
July	7, Thursday evening,	Pianoforte Recital by Mr. Robert Braun, Barnes Hall.
July	8, Friday, before 4 p. m.	Last day for payment of fees at the Treasurer's Office, 1 Morrill Hall.
July	10, Sunday, 11 a. m. and following Sundays,	Preaching in Sage Chapel.
July	10, Sunday evening, and following Sundays,	Organ Recital, Bailey Hall.
July	11, Monday evening,	First lecture in Monday evening course. Continued on following Mondays. Rockefeller Hall.
August	12, Friday,	Summer Session closes

All public exercises in connection with the Summer Session are announced weekly in the University Calendar.

SUMMER SESSION 1921

OFFICERS

Albert William Smith, M.M.E., Acting President of the University.
David Fletcher Hoy, M.S., Registrar of the University.

ADMINISTRATIVE BOARD OF THE SUMMER SESSION

James Edwin Creighton, Ph.D., LL.D., Dean of the Graduate School.
Frank Thilly, Ph.D., LL.D., Dean of the College of Arts and Sciences.
Dexter Simpson Kimball, M.E., Dean of the College of Engineering.

Executive Committee

Robert Morris Ogden, Ph.D., Chairman.
Benton Sullivan Monroe, Ph.D., Secretary.

*STAFF OF INSTRUCTION

Ernest Albee, A.B., Ph.D. Professor of Philosophy	Philosophy
Leland Leavitt Atwood, A.B. Instructor in the Romance Languages and Literatures	French
William Cyrus Ballard, jr. Assistant Professor of Electrical Engineering	Music
Carl Becker, B.Litt. Professor of Modern European History	History
Charles Clarence Bidwell, A.B., Ph.D. Assistant Professor of Physics	Physics
Homer Guy Bishop, B.S., M.S., M.A., Ph.D. Assistant in Psychology	Psychology
Albert Wilhelm Boesche, A.B., Ph.D. Professor of German	German
Robert Braun Musical Director, Braun School of Music	Music
Julian Pleasant Bretz, A.B., Ph.D. Professor of American History	History
Thomas Roland Briggs, A.B., Ph.D. Assistant Professor of Physical Chemistry and Electro-Chemistry	Chemistry
Robert Clarkson Brooks, A.B., Ph.D. Joseph Wharton Professor of Political Science, Swarthmore College	Government
Julia E. Broughton Teacher of Piano and Theory, Little Falls, N. Y.	Music
Arthur Wesley Browne, B.S., M.S., Ph.D. Professor of Inorganic and Analytical Chemistry	Chemistry
Earle Nelson Burrows, C.E., M.C.E. Assistant Professor of Bridge Engineering	Structural Engineering
Harry Caplan, B.A., M.A. Instructor in Public Speaking	Public Speaking
Walter Buckingham Carver, Ph.B., Ph.D. Assistant Professor of Mathematics	Mathematics
Bruce A. Carey Director of Music in Public Schools and Conductor of the Elgar Choir, Hamilton, Canada	Music
Fred Albert Carlson, B.S. Instructor in Geology	Geography
George Herbert Clarke, B.A., M.A. Professor of English, University of the South, and Editor of the Sewanee Review	English
Jacob Roland Collins, B.S., M.S. Instructor in Physics	Physics

*The names of the instructors in the Summer School in Agriculture are given on page 45.

Elizabeth Colwell Boston, Mass.	Music
Robert B. Corey, B.Chem. Assistant in Chemistry	Chemistry
Walter Rodney Cornell, B.S. Assistant Professor of Mechanics of Engineering	Mechanics
Ralph Thomas Kline Cornwell, B.Chem. Instructor in Chemistry	Chemistry
Clyde Firman Craig, A.B., Ph.D. Assistant Professor of Mathematics	Mathematics
James Edwin Creighton, A.B., Ph.D., LL.D. Sage Professor of Logic and Metaphysics, and Dean of the Graduate School	Philosophy
Karl M. Dallenbach, A.B., A.M., Ph.D. Assistant Professor of Psychology	Psychology
Hollis Ellsworth Dann, Mus. D. Professor of Music	Music
Alexander M. Drummond, A.B., A.M. Professor of Public Speaking	Public Speaking
Charles Love Durham, M.A., Ph.D. Professor of Latin	Latin
Florence Dye Teacher of Violin, Public Schools, Akron, O.	Music
Ellsworth David Elston, A.B., A.M. Assistant Professor of Geology, Dartmouth College	Geology
Donald English, B.S., M.B.A. Professor of Economics and Accounting	Economics
Jean M. Gélas Instructor in Physical Education, U. S. Military Academy, West Point	Swimming
Roswell Clifton Gibbs, A.B., A.M., Ph.D. Professor of Physics	Physics
Everett Walton Goodhue, A.B., A.M. Acting Professor of Economics	Economics
Othon Goepp Guerlac, Licencié ès lettres, Licencié en droit Memorial Professor of the Romance Languages and Literatures	French
Lucy Duncan Hall Teacher of Dalcroze Eurhythmics, Francis W. Parker School, Chicago, Illinois	Music
John William Hebel, A.B., A.M., Ph.D. Instructor in English	English
Ernest Herman Hespelt, A.B., A.M. Instructor in the Romance Languages and Literatures	Spanish
Emily Hickman, Ph.D. Professor of History, Wells College	History
William H. Hoerrner Professor of Music, Colgate University	Music
Louis Benjamin Hoisington, A.B., Ph.D. Instructor in Psychology	Psychology
Harley Earl Howe, B.S., M.A., Ph.D. Assistant Professor of Physics	Physics
Eric Vail Howell, C.E., M.C.E. Instructor in Civil Engineering	Mechanics
Everett Lee Hunt, A.B. Assistant Professor of Public Speaking	Public Speaking
Helen Allen Hunt Teacher of Singing, Boston, Mass.	Music
Wallie Abraham Hurwitz, Ph.D. Assistant Professor of Mathematics	Mathematics
James Mead Hyatt, A.B. Instructor in Physics	Physics
Arthur Edward Johnstone Executive Editor, Art Publication Society	Music

Charles Byron Jolliffe, M.S. Instructor in Physics	Physics
Ralph Hayward Keniston, A.B., A.M., Ph.D. Professor of the Romance Languages and Literatures	Spanish
Earle Hesse Kennard, B.A., Ph.D. Assistant Professor of Physics	Physics
Harold Talbot Lacey, B.Chem. Assistant in Chemistry	Chemistry
Lida J. Lowe Teacher of Singing, Boston, Mass.	Music
Asa Emanuel McKinney, A.B., A.M. Instructor in Chemistry	Chemistry
James Frederick Mason, A.B., Ph.D. Professor of the Romance Languages and Literatures	French
David E. Mattern, A.B. Director of School Orchestras and Instrumental Classes, Ithaca, N. Y.	Music
George J. Miller, B.S., M.S. Teacher of Geography, State Normal School, Mankato, Minn., and Editor of the Journal of Geography	Geography
Benton Sullivan Monroe, A.B., A.M., Ph.D. Assistant Professor of English	English
David W. Moore Lecture Assistant in Chemistry	Chemistry
David S. Morse, A.B., A.M. Instructor in Mathematics	Mathematics
Josiah Morse, A.B., A.M., Ph.D. Professor of Philosophy and Psychology, University of South Carolina	Education
Guy Brooks Muchmore, A.B. Assistant Professor of Public Speaking	Public Speaking
Carleton Chase Murdock, B.S., A.M., Ph.D. Assistant Professor of Physics	Physics
Melvin L. Nichols, B.Chem. Instructor in Chemistry	Chemistry
Clark Sutherland Northup, A.B., Ph.D. Professor of English and Librarian of the Hart Memorial Library	English
Robert Morris Ogden, B.S., Ph.D. Professor of Education	Education
William Ridgley Orndorff, A.B., Ph.D. Professor of Organic and Physiological Chemistry	Chemistry
Robert Lee Osburn Director of Music, Maywood, Illinois	Music
Frederick William Owens, Ph.D. Assistant Professor of Mathematics	Mathematics
James Owen Perrine, M.S. Instructor in Physics	Physics
Frank Howell Pollard, B.Chem. Assistant in Chemistry	Chemistry
Miles Albion Pond, Ph.B. Assistant Professor of Civil Engineering	Descriptive Geometry
Paul Russel Pope, A.B., Ph.D. Professor of German	German
James T. Quarles University Organist and Assistant Professor of Music	Music
Homer Franklin Rebert, A.B., A.M.	Latin
Frank Walter Reed, M.A., Ph.D. Instructor in Mathematics	Mathematics
Ernest William Rettger, A.B., Ph.D. Assistant Professor of Applied Mechanics	Mechanics
Arthur John Rider, B.S., M.S. Instructor in Chemistry	Chemistry

Guillermo Rivera, M.A. Instructor in Spanish, Harvard University	Spanish
Louis A. Roux, A.B. Head of the French Department, Newark Academy	French
William Carl Ruediger, Ph.B., Ph.M., Ph.D. Professor of Education and Dean of the Teachers College, George Washington University	Education
Blanche Rumbley Director of Music, Sterling, Colorado	Music
Martin Wright Sampson, B.A., M.A. Goldwin Smith Professor of English Literature	English
Clara Frances Sanford Supervisor of Music, St. Joseph, Mo.	Music
Nathaniel Schmidt, A.B., A.M. Professor of Semitic Languages and Literatures, and of Oriental History	History
Francis Robert Sharpe, B.A., Ph.D. Professor of Mathematics	Mathematics
Luis N. Sherwell Teacher of Spanish, Stuyvesant High School, New York City	Spanish
Virgil Snyder, B.S., A.M., Ph.D. Professor of Mathematics	Mathematics
Ruth Anita St. John Assistant in Geology	Geology
William Strunk, jr., A.B., Ph.D. Professor of English	English
Frederick George Switzer, M.E. Assistant Professor of Hydraulics	Mechanics
Frank Thilly, A.B., Ph.D., LL.D. Professor of Philosophy and Dean of the College of Arts and Sciences	Philosophy
Lewis G. Thomas Teacher of Piano and Theory, St. Louis, Mo.	Music
Edward Bradford Titchener, A.B., A.M., Ph.D., LL.D., D.Sc., Litt.D. Sage Professor of Psychology in the Graduate School, Lecturer in Psychology	Psychology
Mabel Ellsworth Todd Lecturer, Boston, Mass.	Music
Clarence Ellsworth Townsend, M.E. Assistant Professor of Machine Design	Mechanical Drawing
Leonard Church Urquhart, C.E. Assistant Professor of Civil Engineering	Structural Engineering
Harry Schultz Vandiver Instructor in Mathematics	Mathematics
James Raymond Wadsworth, A.B. Instructor in the Romance Languages and Literatures	French
Seth Wakeman, B.A., M.A. Instructor in Education	Education
Albert Edward Wells Professor of Machine Construction	Machine Shop Work
Bernice White Instructor in Music, Hunter College	Music
Frank Ernest Williams Assistant Professor of Geography and Industry, Wharton School, University of Pennsylvania	Geography
Sudie L. Williams Supervisor of Music, Dallas, Texas	Music
E. Jane Wisenall Teacher of Harmony and Choral Music, Woodward High School, Cincinnati, Ohio	Music
Blanche Woody Supervisor of Music, Anderson, Indiana	Music
Edwin H. Zeydel, Ph.D. Linguist, Carnegie Institution, Washington	German

OBJECT OF THE SUMMER SESSION

The primary object of the Summer Session is to advance education by helping those engaged in it. The instruction is adapted to the needs of the following classes:

1. Professors and teachers in colleges and schools, superintendents, and supervisors of special branches of instruction.

The announcements of the different departments show a wide range of work. This work is either advanced and, therefore, suited to specialists who wish to pursue their individual study; or more elementary and adapted to teachers who desire to start in a new field. In addition to the instruction of the class room, the University's libraries, museums, laboratories, and shops are open for use.

2. College students in Cornell or other universities who wish to make some scholastic use of the long vacation, especially those whose college studies may for one reason or another have been interrupted. In the case of graduates some of the courses offered may be counted toward an advanced degree. See the Announcement of the Graduate School for details regarding opportunities for advanced work and research during the summer.

Undergraduates may anticipate requirements and thereby shorten their course, or may make up existing deficiencies. The conditions for receiving credit, and the amount which may be obtained, are stated on pages 8 and 9.

3. Students entering the University and wishing to obtain surplus credit at entrance, or to complete the entrance requirements. It often happens that students have in June more or less than the requirements for admission to college. The Summer Session affords them the opportunity either to add to their surplus and thus, in some cases, to gain a year in time; or to make up their deficiency.

4. All persons qualified to pursue with profit any course given, whether or not they are engaged in formal study or teaching.

ADMISSION, ATTENDANCE, REGISTRATION

There are no examinations for admission to the Summer Session. For conditions of admission to courses in the Summer School in Agriculture, see page 47. Each person must, however, satisfy the instructor in charge of any course (unless it be elementary) that he is qualified to pursue the work. Any duly registered student of the Summer Session may visit such classes as he desires. Admission to the class rooms is restricted to duly registered students. Persons wishing to have work done during the Summer Session counted towards a degree, must conform to the regulations stated under the heading "Academic Credit for Work," page 8.

All students are required to register at the office of the Registrar. They may register on Saturday, July 2, between 8 a. m. and 5 p. m., or upon the day of their arrival, if they reach Ithaca on July 5 or later. Registration on July 2 is urged. Registration in advance of the dates here given is not required.

Class exercises begin at 8 a. m., Tuesday, July 5. Thereafter the Registrar's office is open from 9 a. m. to 4 p. m. every day except Saturday, when it is closed at noon.

Students who wish credit for graduate work must register not only with the Registrar but also with the Dean of the Graduate School, Room 22, Morrill Hall.

TUITION FEE

The single tuition fee, with the exceptions noted below, for the entire Summer Session, whether one course or more is taken, is \$40. This must be paid at the office of the Treasurer, Room 1, Morrill Hall, within five days after registration day. In case of withdrawal within five days from the first registration day, for reasons satisfactory to the Comptroller and the Registrar, the tuition paid may be refunded and the charge cancelled. In case of withdrawal within two weeks after the first registration day, one-half of the tuition may be refunded. In case of registration after the first three weeks of the session, students must pay two-thirds of the full tuition fee. No student is admitted without the payment of this fee. **Admission to classes is restricted to duly registered students.**

For instruction in swimming and fencing an extra fee is charged. See p. 35.

Instruction in all subjects taught in the Summer School in Agriculture is provided by the State of New York, and is free to students registered therein who have been residents of the State for at least one year. See page 47. For all others the tuition is the same as for other work, \$40. Free tuition does not include any instruction outside the College of Agriculture, nor are students receiving free tuition permitted to attend classes outside the College of Agriculture.

Persons taking courses in the Summer School in Agriculture and in any department of the Summer Session must register in both the Summer School and the Summer Session, paying, however, only one tuition fee.

Any tuition fee or other fee may be changed by the Trustees to take effect at any time without previous notice.

LABORATORY FEES

Chemistry. A fee is charged for material actually consumed, and such deposit must be made with the Treasurer as the instructor may prescribe.

Physics. The fee in Physics is at the rate of \$1 for every five hours a week of work in the laboratory. The entire amount must be paid to the Treasurer at the beginning of the session.

Geography and Geology. In course S 8 and in course S 9 a fee of \$1 must be paid in advance to the Treasurer to cover incidental expenses of the course.

Library Deposit. See under Library, page 11.

ACADEMIC CREDIT FOR WORK

In the College of Arts and Sciences. The academic requirements for the degree of Bachelor of Arts are residence for eight terms (four years) and the completion of one hundred and twenty hours of elective work. During the first two years of his course the student must elect twenty-four of his hours under certain restrictions (the underclass requirements), and during his last two years he must elect twenty hours in some one department or group of related departments (the upperclass requirement).

To obtain credit toward the Cornell degree by means of work done in Summer Sessions, a student must have previously satisfied the entrance requirements of the College, and must obtain in advance the Dean's approval of his selection of courses. He may then obtain in any Summer Session credit for the number of hours he passes, between the limits of five and eight hours inclusive, but only for work completed during that session and passed without condition. To obtain credit for a term of residence he must pass a total of at least twelve hours in two or more Sum-

mer Sessions, at least five in each. Credit for two terms of residence, but no more, may be secured in this way.

No credit in hours or residence will be allowed a student not passing at least five hours, except that for a course in a foreign language meeting ten periods a week a student may obtain credit of four hours, which he may combine with eight hours secured in another Summer Session to obtain credit for a term of residence.

In Other Colleges of the University. The nature and amount of credit allowed in other colleges at Cornell for work in the Summer Session may be learned from the statements under the announcement of each course.

In the Graduate School. Graduate work at Cornell is not expressed in terms of courses or of hours. A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may at once enter upon candidacy for an advanced degree if he is able to show that he has had adequate preliminary training in the subjects in which he proposes to work. The requirements for the degree do not depend primarily on the completion of any prescribed number of courses or of a fixed term of residence. They are rather based upon actual achievement in scholarship and research in the fields indicated by the major and minor subjects. The writing of a thesis and the passing of a special examination are also required. The minimum period of residence for the Master's degree is one academic year or its equivalent, and for the Doctor's degree three years.

Not all work done by a graduate student is graduate work in the strict sense of the term. Graduate work to be considered acceptable for a degree must be of advanced character in some field or department of knowledge. No residence towards a master's degree will be granted any student who does not register with the Dean of the Graduate School within three days after the opening of the Session, and who does not formally become a candidate for this degree under the direction of a special committee. The latest day for such registration in 1921 is July 8.

Students of the University Summer Session and the Summer School in Agriculture who have been admitted to candidacy for an advanced degree are required to pay the regular tuition of the session but are exempt from tuition and administration fees in the Graduate School. On registering for the first time as candidates, students who have not previously matriculated in Cornell University will be given matriculation without payment of the usual fee on presenting a certificate that they have paid the tuition charges for the current Summer Session.

Students registered in the Graduate School and excused from tuition in the Summer School in Agriculture as residents of New York State are charged on their first registration in the Graduate School a matriculation fee of \$10, and for each session an administration fee of \$6.25.

The residence requirements for the degree of Master of Arts may be fulfilled in whole or in part by attendance during the Summer Session of the University. For this purpose, two Summer Sessions will be regarded as the equivalent of one term, and four Summer Sessions as the equivalent of one year. Candidates for this degree who are in residence during Summer Sessions only are also required to continue their studies during the year under the direction of the chairman of the special committee in charge of their work.

Any person wishing to become a candidate for an advanced degree and to study during the Summer Session is advised to write to the professor whose work he expects to take, and also to the Dean of the Graduate School, asking for a blank form of application for admission to the Graduate School. It is much better to make these arrangements before coming to Ithaca, thus avoiding delay and interruption of study after the Summer Session has begun. In this way, moreover, it may be possible to secure the advice and guidance of professors in fields of study of which no specific mention is made in the announcements. Not all departments formally offer graduate work.

In certain departments also an invitation is issued to scholars who are beyond the stage of regular graduate study to make use of the resources of the University in these fields for carrying on research.

CERTIFICATES FOR WORK DONE

Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 10, and the applicant must leave at the office of the Registrar a large-sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

COST OF LIVING

The cost of board and furnished room in Ithaca during the Summer Session runs from \$10 a week upwards. In some cases the cost has been reduced to \$9, but it is not safe to count upon less than this sum.

The price of a single furnished room may be as low as \$3 a week. The prices advance with the size and location of the rooms.

Rooms are engaged with the understanding that they will be occupied for the entire session, unless otherwise agreed upon by both parties. Table board is usually engaged by the week, or, if so stated, by the day.

A list of desirable rooms in private houses may be had on application after June 1. Students are cautioned against unauthorized rooming-house agents.

The price of table board runs from \$7 to \$10 in boarding houses. In cafeterias and restaurants, the average cost of meals amounts to about the same sum. Three cafeterias under the management of the University are easily accessible on the campus.

RESIDENTIAL HALLS, ROOMS, BOARD

1. **For Women.** The University has three residential halls for women in which board and rooms may be obtained during the Summer Session by registered students only.

Rooms in these buildings will be reserved in the order of application. Each application for a room must be accompanied by a deposit of \$5; otherwise the application will not be entered. If the room assigned is occupied by the applicant the amount of this deposit is held until the end of the session to cover the return of keys, damage to building or furniture other than ordinary wear and tear, and to insure the completion of the lease. The deposit is refunded if the applicant gives formal notice to the manager on or before June 15 that she wishes to withdraw her application.

In Sage College, which accommodates 175, the charge for room, table board, and a specified amount of laundry, will be, for the session, from \$72 to \$84 according to the size and location of the room.

In Prudence Risley Hall, which accommodates 184, the charge will be from \$78 to \$84 according to the room occupied.

In both buildings this charge includes lodging Friday night, July 1 (not earlier), breakfast Saturday, July 2, and all meals to and including breakfast Saturday, August 13.

Members of the Summer Session who do not room in Sage College or Prudence Risley Hall may obtain table board at either. The charge is \$9 a week.

In Cascadilla Hall a furnished room may be had for the six weeks of the Summer Session at a cost of \$23 to \$29, this charge including a specified amount of laundry. This building is furnished like the others but has shower baths and not tubs. In this building the University maintains a cafeteria restaurant where meals may be had at reasonable rates.

Each of the residential halls is in charge of a warden, who is glad to know the students, to advise them in case of illness or other emergency and to give them what information they may wish about the University, the town, and the community. The regulation of the social life of the students is in the hands of the wardens.

Undergraduate women students of Cornell and other colleges are expected to live in the Residential Halls or in other approved lodgings.

Rooms and board may be secured in private houses. A list of approved houses may be had on request after June 1. It is not safe to engage rooms in places not recommended by the University. For room plans and all information relative to these halls, and to other approved houses for women, apply to Mr. Thomas Tree, Manager of Residential Halls, Sage College, Ithaca, N. Y.

2. **For Men.** Rooms in Baker Court will be available for men students. For room plans and all information concerning Baker Court, apply to the University Treasurer, Ithaca, N. Y.

Checks for reservation of room, or in payment of board bills, should be drawn to the order of Cornell University.

Self-support. Students, both men and women, who may wish to earn a part of their expenses during the Summer Session, are invited to correspond in advance with Mr. Thomas Tree, Sage College, Ithaca, N. Y.

THE LIBRARIES

The University Library is open on week days from 8 a. m., to 10 p. m., except Saturday, when it is closed at 1 p. m. In this building are the main library, containing about five hundred thousand volumes, and most of the seminary and special libraries. The main reading room affords accommodations for more than two hundred readers, and contains a selected library of over 8,000 volumes of reference works. Below stairs is the periodical room in which are kept the current numbers of about five hundred journals in various fields of knowledge. These rooms are open to all students. Students properly qualified are allowed the use of the seminary rooms and the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, to a limited extent, allowed to take out books for home use. Persons wishing this privilege must make a deposit of \$5, which will be refunded upon the return of all books taken out.

The Library of the College of Agriculture, in the basement of Stone Hall, is open on week days from 9 a. m. to 5 p. m., except Saturday, when it is closed at 1 p. m. In it will be found a large collection of bulletins and reports of experi-

ment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, in the Department of Entomology on the fourth floor of the main building, is one of the most complete of its kind in the United States. Nearly all the departments in which instruction is given have well-selected departmental libraries.

SAGE CHAPEL

Religious services are conducted in Sage Chapel throughout the academic year by eminent clergymen selected from the various religious denominations. There will be services in the Chapel on five Sundays during the Summer Session, July 10 to August 7, inclusive.

THE CORNELL INFIRMARY

The Cornell Infirmary is the former mansion of the late Henry Williams Sage, for many years chairman of the Board of Trustees of the University. At his death in 1897, his sons, Dean and William Henry Sage, endowed it and gave it to the University for a students' Infirmary as a memorial to their father. In 1912 a modern fireproof addition was erected with a capacity of sixty-two beds.

The Infirmary, which is in charge of an experienced superintendent, is thoroughly equipped in every way, and is open throughout the University year. It provides suitable rooms, food, and nursing for sick students. It has no medical staff; students employ their own physicians among practitioners in Ithaca or elsewhere.

Students in the University Summer Session and in the Summer School in Agriculture have all the privileges of admission to the Infirmary. They pay no fee in advance, but are liable for regular charges for services rendered.

LECTURES, MUSICAL RECITALS, EXCURSIONS

In addition to the regular class room work there will be public lectures on Monday evenings.

There are also lectures of general interest each week in connection with the various departments. Notice of these will be given in the University Calendar.

Organ recitals will be given on Tuesday evenings in the Sage Chapel and on Sunday evenings in Bailey Hall.

Wednesday evenings are devoted to the departmental conferences, which are open to all interested. Notice of these will be given from week to week.

In connection with the work of the several departments excursions are made to many points of interest. Some of these are open to all members of the Summer Session. Notable for their attractiveness are the excursions to Watkins Glen and to Niagara Falls.

RAILROAD ROUTES

Ithaca is reached by three railroads: the Lehigh Valley; the Delaware, Lackawanna, and Western; and the Central New York Southern. The Ithaca branch of the Lackawanna leaves the main line at Owego. Through trains run from New York and Buffalo on the Lehigh, and through sleeping cars run daily from New York on both roads. From Philadelphia, and from Baltimore, Washington; and the South via the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh at Bethlehem. On the Lehigh, through trains for Ithaca connect with the New York Central at Auburn, and with the Pennsylvania (Northern Central) and the Erie at Elmira. Trains on the Central New York Southern also connect with the New York Central at Auburn.

COURSES OF INSTRUCTION

Most of the courses offered consist of five exercises a week, each week day except Saturday. The number of actual hours of class work in any course may be found by multiplying the number of weekly exercises by six.

Since instruction begins on Tuesday, all classes meeting five times a week will meet at the regular hours on the first Saturday, July 9.

The word "hour" used in reference to University credit means the equivalent of one class exercise a week for a half-year or one semester. One hundred and twenty such "hours" are required of candidates for the A.B. degree.

G. S. = Goldwin Smith Hall.

CHEMISTRY

The courses announced below, correspond entirely or in part with courses given during the regular sessions of the University. For regular students the requirements for admission to the various courses will be the same as during the year.

Teachers may be admitted to any course for which their general training or experience may be considered to prepare them. Every effort will be made to meet the individual needs of teachers by arranging and modifying the work as far as possible so as to fulfil the particular requirements in each case.

Courses in brackets are not given in 1921.

S 1. Introductory Inorganic Chemistry. a. Lectures, daily except Sat., 12, Rockefeller. Professor BROWNE and Mr. MOORE. The lectures deal with the fundamental theories and laws of chemistry, and with the more common elements and their compounds. They are profusely illustrated by experiments. The course is primarily designed to meet the needs of teachers in secondary schools, and to that end emphasis is laid upon methods of lecture presentation and experimental demonstration. Students other than teachers must, before registering, satisfy the department that they are properly prepared to carry on the work.

b. Laboratory work, M W, 8-12, and T Th F, 9-12. Morse Hall. Mr. MCKINNEY and Mr. COREY. A series of experiments designed to illustrate the fundamental laws of chemistry and to acquaint the student with the properties of the principal elements and their compounds. For the benefit of teachers who may take the course special attention will be given to the methods of laboratory instruction, quantitative experiments, and the blowing of simple glass apparatus.

c. Recitations. T Th F, 8. Morse C. Mr. MCKINNEY. The recitations deal with the subject matter of the lectures and with the experimental work in the laboratory; thorough drill in the solution of chemical problems.

Credit for a, b, and c, six hours.

S 5. Analytical Chemistry for Engineers. Lectures, M W F, 11. Morse C. Laboratory, daily except Sat., 1.30-4.30. Mr. RIDER and Mr. —. Credit, three hours. Prerequisite, course 1.

S 6. Elementary Qualitative and Quantitative Analysis. This course is divided into two parts, either of which may be taken without the other. Credit, two, three, or five hours.

A. Qualitative Analysis. Lectures, M W F, 11. Morse C. Laboratory, daily except Sat., 1.30-4.30. Mr. RIDER and Mr. ——. Credit, three hours. An elementary course for those who have had the equivalent of course S 1. A study in laboratory and class room of the methods for detecting and separating the principal bases and inorganic acids. This is followed by the analysis of various substances, either in solution or in solid form, the composition of which is unknown to the students. Considerable emphasis is laid upon the writing of equations expressing the reactions involved in the work.

B. Quantitative Analysis. Elementary. Lectures, T Th, 11. Morse C. Laboratory, M W F, 8-11. Credit, two hours. Mr. RIDER and Mr. ——.

An introduction to quantitative methods and the chemistry upon which these methods are based. Lectures, explanatory of the methods used, are first given; each student then performs simple analyses which involve the use of apparatus ordinarily employed in analytical work.

Advanced work (see course S 14) may be taken by students who complete this course before the close of the session.

S 7. Qualitative Analysis. Lectures and recitations, daily except Sat., 8. Morse A. Laboratory, daily except Sat., 1.30-4.30, and M W F, 9-12. Mr. RIDER and Mr. ——. Credit, one to six hours.

This course comprises (1) a study in class room and laboratory of the methods for detecting each of the important acids in the presence of the others, together with the reactions involved, followed by the analysis of more complex mixtures than those assigned in course S 6A; and (2) a comparative study in the laboratory of different methods of detecting and separating the bases.

S 12. Quantitative Analysis. Lectures, daily except Sat., 8. Morse C. Laboratory, daily except Sat., 9-1. Mr. NICHOLS and Mr. BRANDES. Credit, four, five, or six hours.

A longer elementary course in which extended practice in volumetric and gravimetric analysis is offered.

S 14. Quantitative Analysis, Advanced Course. Laboratory practice at hours to be arranged. Credit, one, two, three, or four hours. Mr. NICHOLS and Mr. BRANDES.

This course comprises instruction in certain gravimetric, volumetric, and electrochemical methods of analysis and in the methods of combustion analysis. The work includes the analysis of iron ores, iron and steel, slags, coal and coke, cements and cement materials, alloys, ores of copper, lead, zinc, mercury, manganese, tin, etc.

[S 16. Electrochemical Analysis. Laboratory Practice. Credit, one hour.]

[S 19. Qualitative and Quantitative Gas Analysis. Lectures. Credit, two hours.]

[S 20. Technical Gas Analysis. Laboratory. Open to those who have taken or are taking Course S 19. Credit, two hours.]

[S 24. Opticochemical Methods. Lectures. Morse 119. Laboratory practice. Credit, three hours.]

[S. 25 Opticochemical Methods. Advanced Course. Laboratory. Credit, one or more hours.]

S 30. Organic Chemistry.

A. Aliphatic compounds. Lectures and recitations. Daily, 8. Morse 119. Laboratory practice at hours to be arranged. Credit, four to six hours. Professor ORNDORFF, Mr. CORNWELL, and Mr. LACEY.

B. Aromatic compounds. Lectures and recitations. Daily, 12. Sibley. Laboratory practice at hours to be arranged. Credit, four to six hours. Mr. CORNWELL and Mr. LACEY.

This course presupposes a knowledge of elementary chemistry. Part B must be preceded or accompanied by Part A. The two parts of the course may be taken together or Part A may be taken one summer and Part B the following summer.

S 31. Organic Chemistry.

A. Aliphatic compounds. Lectures and recitations. Daily, 8. Morse 119. Credit, three hours. Professor ORNDORFF and Mr. LACEY.

B. Aromatic compounds. Lectures and recitations. Daily, 12. Sibley. Credit, three hours. Mr. CORNWELL and Mr. LACEY.

These lectures and recitations are the same as those of Course S 30. Course S 30 should be taken in preference to Course S 31 whenever it is possible.

S 32. Organic Chemistry, Shorter Course. Aliphatic and aromatic compounds. Lectures and recitations. Daily, 8, Morse 119; daily, 12, Sibley, during the first three weeks of the session, and 8, only, during the remainder of the session. Laboratory practice at hours to be arranged. Credit, six hours. Professor ORNDORFF, Mr. CORNWELL, and Mr. LACEY.

The lectures and recitations of this course include all of those of Course S 30 A, and the first half of those of Course S 30 B. Course S 32 presupposes a knowledge of elementary chemistry, and is designed more particularly for students registered in the Colleges of Medicine and Agriculture.

S 34. Advanced Organic Chemistry. Laboratory practice at hours to be arranged. Credit, two or more hours. Professor ORNDORFF, Mr. CORNWELL, and Mr. LACEY.

The course in the preparation of organic compounds is here continued, the preparations, however, being more difficult, and requiring more skill and experience on the part of the student.

S 37. Methods of Organic Analysis. Laboratory practice, with occasional lectures. Hours to be arranged. Credit, two or more hours. Professor ORNDORFF, Mr. CORNWELL, and Mr. LACEY.

This course comprises the qualitative and quantitative analysis of pure organic compounds, and of such commercial products as alcohols, ethers, organic acids, glycerol, formalin, acetates, soaps, turpentine, rosin oils, etc.

S 38. The Coal Tar Dyestuffs. Laboratory practice. Credit, two to four hours. Open to those who have had course 33. Professor ORNDORFF and Mr. CORNWELL. Hours to be arranged.

Various intermediate products used in the preparation of dyes are made and from these, representatives of the different groups of dyestuffs are prepared and studied.

[S 48. Selected Topics in Advanced Inorganic Chemistry. Lectures. Credit, one hour.]

S 50. Introductory Physical Chemistry.

A. Lectures, daily, 8, Rockefeller. Credit, three hours. Assistant Professor BRIGGS and Mr. POLLARD. A systematic presentation of modern chemical theory. The subject matter includes: atomic and molecular theory; gases, liquids, and solids; the theory of solution; colloid chemistry and adsorption; reaction velocity, catalysis, and equilibrium in homogeneous systems; application of physicochemical principles to actual practice.

B. Lectures, daily, 9, Rockefeller. Credit, three hours. Assistant Professor BRIGGS and Mr. POLLARD. A continuation of Part A. The subject matter includes the phase rule and its applications; thermochemistry; electrochemistry; photochemistry; application of the principles of physical chemistry to actual practice.

S 51. Physical Chemistry Laboratory. A. Laboratory practice, daily except Sat., 8-1. Credit, three hours. Assistant Professor BRIGGS and Mr. POLLARD. Open to those only who have taken or are taking Course 50 A or its equivalent. With the data obtained in the laboratory as a basis, detailed reports are written covering each of the following topics: calibration of volume-measuring apparatus; molecular weight determination by vapor density, boiling point, and freezing point methods; vapor pressure; viscosity; distillation of liquid mixtures.

B. Laboratory practice, daily except Sat., 9-1. Credit, three hours. Assistant Professor BRIGGS and Mr. POLLARD. Open to those only who have taken or are taking Course 50 B or its equivalent. The course is a continuation of Part A. The following topics are considered: dissociation; solubility; reactions; reaction velocity and catalysis; indicators; thermochemistry; diffusion; colloids and adsorption; photochemical reactions; phase rule studies of inversion points; solid-liquid; liquid-liquid; compounds.

S 57. Laboratory Practice in Physical Chemistry. Credit, one to three hours. Laboratory periods to be arranged. Assistant Professor BRIGGS and Mr. POLLARD.

This course is designed to afford opportunity for special laboratory practice in physical chemistry, colloid chemistry, or electrochemistry.

[S 65. **Chemical Microscopy, Elementary.** Lectures, demonstrations, and laboratory practice at hours to be arranged. Credit, two hours.]

[S 66. **Chemical Microscopy, Advanced.** Laboratory practice at hours to be arranged. Credit, three hours.]

S 96. Research. Credit, one to six hours. Senior chemists, and others by special permission, may elect research under the direction of some member of the staff of instruction.

For courses in agricultural chemistry see pages 49, 50, of this announcement.

DRAWING

S 3. Mechanical Drawing for Secondary Schools. East Sibley 205. Assistant Professor TOWNSEND.

This course is designed for those who wish to teach mechanical drawing in secondary schools and for those who feel the need of a more complete knowledge of this subject to assist them in teaching shop work. Some of the topics covered

are use of instruments, lettering, orthographic and isometric projection, inking, tracing, conventions, and working drawings. Students familiar with these topics may elect a more advanced course.

Students should be provided with a set of drawing instruments, an architect's scale, a 30°-60° and a 45° triangle.

S 4. Mechanical Drawing. M W F, 8-11, and daily except Sat., 2-5. East Sibley 205. Assistant Professor TOWNSEND.

A course in drawing for beginners, covering use of instruments, orthographic and isometric projection, inking, tracing, convention, working drawings.

S 5. Machine Sketching and Drawing. M W F, 8-11, and daily except, Sat., 2-5. East Sibley 205. Assistant Professor TOWNSEND.

A more advanced course in mechanical drawing for those who have the equivalent of course S 1. Sketching of machine parts, machine drawing from sketches, empirical design. This course is an application of the work in course S 1 to such machine designing as can be done without a knowledge of mechanics.

S 6. Descriptive Geometry. Lectures, daily except Sat., 9. Recitations and drawing, daily except Sat., 10-12. Lincoln Hall. Assistant Professor POND.

A study of the representation of lines, planes, surfaces, and solids, and their interrelations. Warped surfaces. Tangencies. Intersections, shades and shadows, and perspective. The work is the same as that given in the regular C.E. course 1, and the student will receive four credit hours if he takes the whole course. A three-hour course that does not include shades and shadows and perspective, and fulfills the requirements for the Mechanical Engineering students of Sibley College will also be given. The latter will be given from 2-5 p. m. if there are students enough to make up an extra section. The morning and afternoon sessions make it possible to readjust the schedule so as to accommodate nearly all who may wish to take either course.

ECONOMICS

The following courses are designed to meet the needs of three classes of students in the Summer-Session: (1) those desiring regular college credit for general economics; (2) students with special interests in economic subjects; (3) students seeking broad preparation for the teaching of economics in secondary schools. For the first group, Course S 1 covers the subject matter usually included under elementary economics. For Cornell students Course S 1 satisfies the Economics requirement in the College of Engineering and will also serve in lieu of Course 51 as a prerequisite to admission to various advanced courses in Economics. Graduate students wishing to pursue special investigations will be afforded assistance by members of the Summer Session staff of instruction, and by other members of the Department of Economics of the University who may be in residence in Ithaca during the summer.

S 1. Principles of Economics. Twice daily except Sat., 10 and 11. G. S. 264. Credit, four hours. Professor GOODHUE.

A general introduction to economics, covering the fundamental principles of value and the distribution of wealth, together with the elements of money and banking.

S 2. Elements of Accounting. Daily except Sat., 8. Goldwin Smith 242. Credit, two hours. Professor ENGLISH.

The theory of debit and credit in double entry bookkeeping; the classification of accounts; the construction and use of a simple accounting system; the preparation and interpretation of financial statements.

A special conference for teachers will be conducted in connection with this course at an hour to be arranged.

S 3. Corporation Finance. Daily except Sat., 9 G. S. 242. Credit, two hours. Professor ENGLISH.

A study of the organization, administration, and regulation of corporations. Particular attention will be paid to the financial aspects of the subject.

S 4. Modern Banking Systems. Credit, two hours. Professor GODDUE. Time and place to be arranged. A comparative study of the banking systems of England, France, Germany, Canada, and the United States. For advanced students only.

EDUCATION

Courses S 1, S 2, S 3, and S 4, will be found especially helpful to college graduates who are preparing for examinations in professional subjects as outlined in the New York State Syllabus and Course of Study for the renewal of the College Graduate Certificate Limited. The State Department of Education will hold an official examination for such candidates at Ithaca, August 18 and 19.

S 1. Educational Psychology. Daily except Sat., 10. G. S. 256. Credit, two hours. Professor OGDEN.

A study of the learning process and its application to educational theory and practice; the original nature of man, reflex action and instinct; the acquisition of habits; attention, memory, association, and thinking; fatigue, individual differences, and social co-operation. The textbook used in this course will be Gordon's *Educational Psychology*.

S 2. Principles of Education. Daily except Sat., 11. G. S. 256. Credit, two hours. Professor RUEDIGER.

A study of education from the sociological standpoint; the biological and psychological bases; the problem of aim; formal discipline; social and personal objectives; the studies and their functions; the administrative curriculum.

Texts: Ruediger, *Principles of Education*; and Bobbitt, *The Curriculum*.

S 3. History of Education. Lectures, recitations, and prescribed readings. Daily except Sat., 9. G. S. 256. Credit, two hours. Professor MORSE.

The purpose of this course is to give an understanding of present educational values and practices through an historical consideration of their origin and development. Throughout the course, therefore, attempt will be made not only to outline the problems and their solutions, but to correlate education with the life and the social, psychological, and economic conditions of the times. Only such theories and practices as later proved themselves influential will be considered.

The topics treated are to a great extent those emphasized in the syllabus for the New York State Teachers' Certificate; education in primitive and barbaric

societies; Greek and Roman education; the rise of the school as an institution; scholasticism, humanism, and realism; the rise of science; the 'psychological' movement; the origin and nature of specifically modern tendencies in education.

Textbook: Graves, *Student's History of Education*.

S 4. Method in Teaching. Daily except Sat., 12. G. S. 256. Credit, two hours. Professor RUEDIGER.

A study of the principles underlying the teaching process in its intellectual, emotional, and motor phases: the types of subject matter: development and didactic instruction; fixing habits, knowledge, and ideals; overcoming verbalism; interest and effort; questioning; lesson assignment; lesson plans; class management.

Textbook: Parker, *Methods of Teaching in High Schools*.

S 7. Mental Measurements. Lectures, prescribed readings, and laboratory. Daily except Sat., 8. G. S. 256. Laboratory, T Th, 2-4.30. G. S. 248. Credit, three hours. Mr. WAKEMAN.

The first half of this course furnishes a general introduction to the psychology and practice of mental tests. The lectures will deal with the historical development of tests; the principles underlying their formation and application; the single tests and the test systems; a detailed study of the principles and use of the Stanford Revision of the Binet-Simon Scale; a brief consideration of the measures of central tendency, variability, and correlation; the bearing of tests upon the problems of psychological theory (nature and distribution of intelligence, the correlation of abilities, etc.). The laboratory work is intended to give practice in administering tests, both to individuals and to groups.

The second half of the course will consider the use of the tests in schools for the diagnosis of defective and exceptional abilities; the causes, frequency, and consequences of mental deficiency; the social and educational treatment of defective, delinquent, retarded, superior, and psychopathic children.

Textbooks: Terman, *The Measurement of Intelligence*. Woodrow, *Brightness and Dullness in Children*.

Laboratory Manual: Whipple, *Manual of Mental and Physical Tests*, Vol. I.

S 9. Advanced Work in Education. Hours and credits to be arranged. G. S. 248. Professor OGDEN and the other members of the staff.

As a prerequisite for this course one of the courses S 2, S 3, or S 7, or an equivalent, is necessary. The work may consist either of essays and reports upon some special topic, or of laboratory practice of an advanced grade. A seminary will be held if application is made by a sufficient number of advanced students.

TRAINING COURSE FOR PSYCHOLOGICAL EXAMINERS

By recent legislative enactment of the State of New York, special classes for defective children must be formed whenever ten or more such cases are found in any school district. A similar law is operative in New Jersey, and like requirements are being made in other states. Not only is there a considerable consequent demand for teachers trained in the examination and instruction of defectives, but with the increasing recognition of the extent and importance of individual differences in endowment, there is increasing recognition of the usefulness of

familiarity with the methods and interpretation of psychological examinations, not only for the mentally backward and subnormal, but also for the normal and supernormal, and in other fields than that of education.

To assist in meeting these various needs, the departments of Education and Psychology call special attention to courses in Introductory, Experimental, and Educational Psychology, and to the course in Mental Measurements. The latter has been expanded to give a thorough training in administration of tests, and in the evaluation and application of results. Students who wish to enter this course with a view to educational and field service, are advised to register for such additional courses in Psychology as may be helpful in providing an adequate understanding of psychological principles and methods of investigation. Advice in the selection of courses with regard to the individual needs of the student may be had by consulting Professor R. M. Ogden, Goldwin Smith Hall 246, either in person or by letter.

ENGLISH

Courses S 1 and S 2 taken together will be considered the equivalent of the first term of course 1 in the regular University session.

Courses in brackets are not given in the summer of 1921, but may be expected in the summer of 1922.

S 1. Composition. Daily except Sat., 8. G. S. 156. Credit, two hours. Dr. HEBEL.

A practical drill intended for those who lack proficiency in writing; discussion of the elements and forms of discourse; frequent exercises, mainly expository; personal conferences at hours to be appointed.

S 2. Introductory Course in Literature. Daily except Sat., 9. G. S. 164. Credit, two hours. Dr. HEBEL.

Primarily a study of five of The Idylls of the King: The Coming of Arthur, Lancelot and Elaine, The Holy Grail, Guinevere, and The Passing of Arthur; and of the first, fifth, sixth, and seventh books of The Ring and the Book; and supplementary reading in Tennyson and Browning.

S 4. Advanced Composition. Daily except Sat., 11. G. S. 164. Credit, two hours. Professor STRUNK.

The planning, writing, and criticism of essays and of other exercises in composition, accompanied by a study of general principles of writing and of questions of English usage. The work of the class will be supplemented by personal conferences. Open only to students who have had course S 1 or its equivalent.

S 5. Teachers' Course. Daily except Sat., 10. G. S. 156. Credit, two hours. Professor NORTHUP.

Lectures, readings, reports, and discussions. Designed for those who are teaching or who expect to teach English in schools. The organization of the high school course in English; methods of treating the works named by the Conference on Uniform Entrance Requirements in English; the teaching of literature in general; supplementary reading for pupils and teacher; the use of the school library and the public library; stage productions; the place of language and grammar in the high school; problems of oral and written composition; the relation of composition to literature and to other subjects in the curriculum.

[S 6. **Nineteenth Century Poetry.** Daily except Sat., 8. G. S. 160. Credit, two hours.

A study of the poetry of Wordsworth and of Coleridge.]

S 7. **Nineteenth Century Poetry.** Daily except Sat., 11. G. S. 156. Credit, two hours. Professor SAMPSON.

A study and discussion of the most important poems of Byron, Shelley, and Keats.

[S 8. **Modern Prose.** Daily except Sat., 11. G. S. 164. Credit, two hours.

The nature of prose, and the principles of structure and style; essays and extract from the works of Stevenson, Pater, Ruskin, and Newman, or other nineteenth-century English authors.]

[S 9. **History of the English Drama.** Daily except Sat., 9. G. S. 160. Credit, two hours.

An historical survey of the English drama from its origin to the close of the Elizabethan period, with a reading of typical plays.]

S 10. **Shakespeare.** Daily except Sat., 9. G. S. 156. Credit, two hours. Professor STRUNK.

A study of a limited number of tragedies—including Hamlet and Macbeth, required by the College Entrance Examination Board—with stress upon the art of Shakespeare as a playwright.

S 11. **American Literature.** Daily except Sat., 12. G. S. 156. Credit, two hours. Professor NORTHUP.

A study of the American poets of the nineteenth century with particular attention to Bryant, Poe, Whittier, Longfellow, Lowell, Holmes, and Emerson. Text: Page, *Chief American Poets*.

S 12. **Victorian Literature.** Daily except Sat., 12. G. S. 164. Credit, two hours. Professor CLARKE.

Lectures, readings, reports, and discussions of the leading characteristics and literary tendencies of the nineteenth century; the literary reflection of social changes; the relation of science and politics to literature; illustrative readings in the works of Tennyson, Browning, Arnold, Clough, Swinburne, Morris, Rossetti, with a glance at the novelists and essayists.

This course does not cover the ground of course S 2.

[S 13. **The English Novel.** Daily except Sat., 12. G. S. 164. Credit, two hours.

A brief historical survey of the novel in English is followed by detailed study and discussion of the novelists of the nineteenth century. This course may serviceably supplement course S 12.]

S 14. **Modern Drama.** Daily except Sat., 10. G. S. 160. Credit, two hours. Professor SAMPSON.

Reading and discussion of characteristic plays of some of the more important recent dramatists—Ibsen, Strindberg, Bjørnson, Tchekhov, Shaw, Galsworthy, and others; consideration of the modern theatre; current theories of drama.

[S 15. **Dramatic Structure.** Daily except Sat., 10. G. S. 160. Credit, two hours.

An advanced course designed for those who have completed two or more college courses in English, or whose reading serves as an equivalent for freshman and sophomore work.

A study of the principles of dramatic construction, based upon Greek, Elizabethan, and modern drama. Reading of about thirty representative plays.]

S 16. The English Language. Daily except Sat., 9. G. S. 162. Credit, two hours. Assistant Professor MONROE.

A study of essential features in the growth and development of the mother-tongue. Among the topics considered are: language and grammar in general; some misconceptions about the life of language; the relationships of English; phonetics, with practical exercises; the English vocabulary; inflections; native resources and foreign influences; modern English grammar; syntax; disputed usages; the bearing of historical grammar on present forms and usages, spoken and written.

Recitations, lectures, collateral reading. The course does not require previous knowledge of Old or Middle English.

S 17. Recent English Poetry. Daily except Sat., 10. G. S. 164. Credit, two hours. Professor CLARKE.

A critical study of the poetical work of Robert Bridges, Rudyard Kipling, W. B. Yeats, Thomas Hardy, Sir William Watson, Sir Henry Newbolt, John Masefield, Alfred Noyes, W. W. Gibson, and Francis Ledwidge. Consideration of other contemporary work, including the "new poetry" and the poetry of the War.

S 18. Old English. Daily except Sat., 11. G. S. 162. Credit, two hours. Assistant Professor MONROE.

This course is intended for students who, lacking the opportunity hitherto, now wish by earnest effort to acquire some knowledge of English in its early form. Lessons in grammar are followed as soon as possible by the reading of easy prose of the time of Alfred the Great.

The course may be taken by undergraduates; and, with additional reading, by graduates as a part of their work for the master's degree. The time of meeting may be changed to suit the convenience of the class.

[**S 19. Literary Criticism.** Daily except Sat., 10. G. S. 164. Credit, two hours.

The principles of literary art, studied in connection with masterpieces from ancient and modern poets.]

Middle English Literature. For graduates only. Hours and room to be arranged. Professor NORTHUP.

A study of some of the leading tendencies in late Middle English literature. The special topic for this session will be the life and works of Chaucer.

Criticism of the Drama. A study of Aristotle's *Poetics*, Sidney's *Defence*, and Dryden's *Essay of Dramatic Poesy*, with reading of illustrative plays, including Greek plays in translation. Discussions and reports. Open to graduates only. Two afternoon hours a week, time to be arranged. Preliminary meeting, Monday, July 11, 3 p. m. G. S. 160. Professor STRUNK.

GEOGRAPHY AND GEOLOGY

Illustrated Special Announcement. A special announcement with many photographic illustrations showing typical features of the Cornell environment and the work of excursion classes in the field is published for the department and may be had post-free on application to the Secretary of the Summer Session. The text of this special announcement is devoted largely to an explanation of the advantages of the Cornell region for outdoor study of both geography and geology. As the special announcement was issued in 1914, it should be noted that there are changes in the courses for 1921 as listed in the following paragraphs.

Equipment and Purpose. The lecture rooms and laboratories are in McGraw Hall. It is the purpose in this department to meet, primarily, the needs of teachers in grammar schools, high schools, normal schools, and colleges. A second aim is to provide courses of practical and cultural value to college students. The work embraces lectures, laboratory, and field instruction in physical and industrial geography, and in the elements of geology; also educational methods in geography.

The environs of Cornell University are rich in phenomena of geographic and geologic interest. Field excursions, consequently, are made an especially important part of the work of this department in the Summer Session.

The laboratories are well equipped with apparatus and illustrative material for instruction. This material includes teaching and reference collections of minerals, rocks, fossils, maps, photographs, models, and more than five thousand lantern slides.

For entrance credit ($\frac{1}{2}$ unit) in physical geography, a student is required to attend, complete all required work, and pass the examinations in courses S 1, S 8, and S 10.

LECTURE COURSES IN GEOGRAPHY AND GEOLOGY

S 1. Physical Geography. Daily except Sat., 9. Lecture room, McGraw Hall, first floor, south end. Assistant Professor WILLIAMS. Credit, two hours.

An introductory course in physical geography including the continents and the atmosphere; theories of the origin of the earth; its motions and their consequences; the growth of the continents; the uplift and denudation of the land; the work of the atmosphere, ground water, streams, and glaciers; the glaciation of North America; the influence of geographical environment upon plant and animal life and man's response to his physical surroundings.

The lectures in physical geography are fully illustrated by lantern slides, wall and globe maps. Students registering in this course are advised to take also the related courses S 8 and S 10, and if possible S 5.

S 2. Commercial and Industrial Geography. Daily except Sat., 11. Geographical Lecture Room. Mr. MILLER. Credit, two hours.

The course will consist of lectures, readings, discussions, and a written report on a selected topic. Consideration will be given such topics as transportation, geographic factors influencing the development of industry, commerce, and natural resources. The fundamental principles of commerce and industry will be developed by the study of a few commercial commodities, their manufacture and distribution, together with a few of the world's commercial highways. The

course will be helpful to grade and high school teachers. Smith's *Commerce and Industry* or his *Industrial and Commercial Geography*, and his *World's Food Resources* will be useful.

S 3. The Teaching of Geography. Daily except Sat., 8. Physical Geography Laboratory. Mr. MILLER. Credit, two hours.

The course will consist of lectures and discussions dealing with the essentials of modern geography and criteria for their determination; the aims to be accomplished in teaching geography in the grades and the high school; reasons for the ineffectiveness of much geography teaching; where to place the emphasis in teaching a given subject; consideration of the project-problem and type-study methods of teaching; geography tests; the use of supplementary materials; essential geography equipment, etc.

S 4. Mathematical Geography. Daily except Sat., 12. Geological Lecture Room. Assistant Professor WILLIAMS. Credit, two hours.

A consideration of the shape and motions of the earth; the relation of the earth to other bodies of the heavens; results of earth's shape and motions; latitude and longitude; standard time; the inclination of earth's axis and relation to light, heat, zones, and seasons; the effect of the earth's motions on hydrosphere and atmosphere; and the direct and indirect influences of these on man's activity.

S 5. Geology. A General Introductory Course. Daily except Sat., 10. Geological Lecture Room. Assistant Professor ELSTON. Credit, two hours.

Among the topics discussed are: origin of the earth; geological evolution of continents and ocean basins, the significance, areal distribution, and structural features of the great rock groups, as well as the forces modifying them; vulcanism, earthquakes, and similar phenomena; development of the life of the earth.

The lectures will be illustrated with lantern slides, models, maps, and specimens. Students registering for this course are urged to take the laboratory course S 9 and, if possible, course S 10.

S 6. Mineral Resources. Daily except Sat., 12. Credit, two hours. Assistant Professor ELSTON.

A general course descriptive of the more important mineral resources of the United States, with briefer reference to commercially important foreign resources. Among the topics discussed are: distribution, uses, manufacture, production by countries, commercial interdependence.

LABORATORY AND EXCURSION COURSES IN BOTH GEOGRAPHY AND GEOLOGY

S 8. Physical Geography, Laboratory Course. T Th, 2-4. Physical Geography Laboratories. Credit, one hour. Mr. CARLSON.

The members of this class will make a systematic study of the physiographic regions of the United States using contour maps, models, and the experimental laboratory of the department in a laboratory study of the subject. By such study of the topographic, regional, and life relationships (human, animal, and plant) the geography of the United States will be correlated and presented as an orderly whole. The course will prove of worth to grade teachers of geography who wish

to obtain a broader basis for their work in the subject as well as for those who expect to teach geography in the high schools.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 9. Geology, Laboratory Course. W F, 2-4. General Geology Laboratory. Credit, one hour. Mr. CARLSON.

This course is designed to supplement course S 5. A study will be made of the more common structural phenomena; of the interpretation and uses of geological maps; of characteristic life forms developed in different geologic periods; and of the more common rocks and minerals. Short field excursions will be made to collect both rock specimens and fossils.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 10. Geography and Geology, Field Course. This course should be elected by all those registering in Course S 1 or S 5 and is required of all those who desire entrance credit in physical geography. With courses S 1 and S 8 it affords a comprehensive course in physical geography; with courses S 5 and S 9 it will give a similarly broad training in elementary geology, as the dynamic phases of geology are emphasized on the excursions. Mimeographed outlines of the excursions are to be secured by each student desiring credit.

Students not registered in the course or department are invited to attend these excursions but must conform to the directions of those in charge. Those desiring University or entrance credit must take field notes and hand in written reports. Excursions 1, 2, 3, 5, 6 are required of all students in the course, and in addition for one hour's credit they must make either 10, or two of 7, 8, and 11.

Meeting place and time announced in mimeographed outlines or by bulletin. Meet for first excursion, Monday, July 11, at East Ithaca Station, 2.00 p. m. Excursions 1-6, Monday afternoons; 7, 8, 11, all day Saturday; 10 starts on Saturday. On the excursions to which a cost is attached persons wishing to go must register at the department and secure tickets in advance of the date of the trip.

The longer excursions will be under the general charge of Professor ELSTON, with the co-operation and assistance of the other members of the instructing staff. On the excursions stops will be made at points of interest, explanations made, questions asked, and discussion invited.

OUTLINE OF EXCURSIONS—Course S 10

Monday Afternoons

1. **Eagle Hill.** To become acquainted with the lie of the land about Cornell, to learn the place names of the broader physiographic features, studying en route processes of weathering, and, at the summit, the maturely dissected plateau. The top of the hill is a vantage point from which a good view of the lake and the land for miles to the north, east, and west may be had. July 11.

2. **Fall Creek and Deadhead Hill.** To study the origin and nature of sedimentary rocks, also processes of erosion, transportation, deposition, and

cementation. An intimate view of one of the large gorges and its especial features, particularly Ithaca Falls. July 18.

3. **Shore of Cayuga Lake.** To study shore line phenomena, joint planes, bedding, and stalactite formation. A walk for several miles along the east shore of the Lake. Probably a return by trolley. July 25.

5. **Terminal Moraine. North Spencer.** By train or auto-truck. To study a massive morainic loop, the basin in which the former ice tongue rested, and the outwash deposits and overflow channels to the south. Truncated valley sides due to glacial erosion. The most striking examples of glacial phenomena in the Cornell region. August 1.

6. **Six Mile Creek.** To study the effect of glaciation on a stream course. Relations to water supply and power development. A climb into and walk through one of the gorges in Six Mile Creek and an interpretation of its complicated physiographic history. August 8.

All-Day Excursions

7. **Taughannock Gorge and Falls.** By auto-truck. To study the Inlet Plain, its reclamation, the Barge Canal terminal, the position and succession of the Devonian strata along the lake shore and the deep gorge and falls of Taughannock. A sail along the west shore of the lake and a walk through the great gorge to Taughannock Falls, one of the highest straight falls east of the Rockies. Luncheon at the foot of the falls. July 16.

8. **Enfield Gorge and Falls; and Connecticut Hill.** By auto-truck. To study the relations of preglacial and hanging valleys and the postglacial and interglacial gorges, their origin and features. Joint plane guidance of stream courses. A ride to the head of the gorge, climb through it to the crest of Lucifer Falls. Enfield is perhaps the most picturesque and wildest of the gorges in the Cornell region. In the afternoon, a ride to the top of Connecticut Hill, the highest point in the region. July 23.

Longer Excursions

10. **Niagara Falls and Gorge.** By train and trolley cars, if railroad conditions permit. Overnight at Niagara Falls. July 30. Open to all students in the Summer Session.

All the important scenic features of Niagara Falls and Gorge are visited and their physiographic history interpreted. As a whole these phenomena constitute a striking record of some of the most interesting chapters in the geologic and physiographic history of North America. Before the trip a special meeting of those interested will be held in the Physical Geography Laboratory, when the relations of the different places will be explained and illustrated by a large scale relief model of the Niagara region. Students are advised to send to Director U. S. Geological Survey, Washington, D. C., for a copy of Niagara Folio, No. 190, in octavo form; cost 5c in coin or money order.

11. **Watkins Glen.** By auto-truck. August 6. Open to all students in the Summer Session.

Watkins Glen is considered one of the most beautiful scenic spots in the country. It has been secured for a state park by New York and all parts of it made accessible. The excursion party will study the gorge, its pot holes and falls in detail; and consider its relations to the Seneca Lake valley in comparison with the conditions at Ithaca as related to the Cayuga valley. Ride across the dissected upland country to the south and west between Ithaca and Watkins.

GERMAN

S 1. First Year German. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 183. Professor POPE. Credit, four hours. Entrance credit, one unit.

This course affords an opportunity for those who have had no German to acquire a practical working vocabulary, to master the essentials of grammar, to learn to read easy German, and to begin conversational work in the language. As far as possible the language of the class room will be German. After successfully completing this course, students can, by supplementary reading during the summer, prepare themselves for the fall entrance examination in second year German.

S 2. Second Year German. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 177. Dr. ZEYDEL. Credit, four hours. Entrance credit, one unit (second unit).

Prerequisite: one year of high school German or its equivalent.

S 3. Third Year German. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 190. Professor BOESCHE. Credit, four hours. Entrance credit, one unit (third unit).

Prerequisite: two years of high school German or its equivalent.

S 4. Lyric and Ballad Poetry. Daily except Sat., 9. G. S. 177. Credit, two hours. Professor POPE.

The development of German lyric poetry from the Middle High German period to the present. Especial attention given to a literary appreciation of modern lyrics and ballads. Some time will be devoted to a study of German lyrics and ballads in the settings of modern German composers.

German Readings. Interpretative readings from modern German literature will be given on Thursday evenings at 8 o'clock in G. S. 190 by Professor BOESCHE.

GOVERNMENT

S 1. American Government. Daily except Sat., 9. G. S. 227. Credit, two hours. Professor BROOKS.

The organization and activities of the government of the United States, including the federal, commonwealth, local, and municipal systems. Attention is also given to the government of our dependencies and to the position of the United States in foreign affairs. This course is intended especially for teachers of Civics.

S 2. American Political Parties and Party Problems. Daily except Sat., 10. G. S. 227. Credit, two hours. Professor BROOKS.

A study of the growth, organization, aims, and methods of political parties in the United States, with particular reference to the primary and convention systems, financing of parties, and proposed reforms, especially civil service reform, the short ballot, proportional representation, the initiative, referendum, and recall.

HISTORY

S 1. Greek and Roman History. Daily except Sat., 11. G. S. 134. Professor SCHMIDT.

A survey of the history of the Greeks from the earliest times to Augustus, and of the Romans to the fall of the Empire. Lectures, collateral reading, and examinations.

S 2. Oriental History. Daily except Sat., 12. G. S. 134. Professor SCHMIDT.

A survey of the history of the ancient Egyptian, Babylonian, Assyrian, Medo-Persian, Hittite, and Aegean civilizations. Lectures, collateral reading, and examinations.

[S 3. **Modern European History.** The History of Europe since 1815.] Not given in 1921.

[S 4. **The French Revolution.**] Not given in 1921.

S 5. Modern European History. Daily except Sat., 10. G. S. 242. Credit, two hours. Professor BECKER.

The history of Europe from the sixteenth century to 1815.

S 6. The Napoleonic Era. Daily except Sat., 11. G. S. 242. Credit, two hours. Professor BECKER.

The history of the rise and fall of the Napoleonic Empire in Europe, 1799-1815.

S 9. American History. Constitutional Problems. Daily except Sat., 8. G. S. 234. Credit, two hours. Professor BRETZ.

A survey of the more important constitutional problems since the establishment of the Federal government. Special attention is paid to constitutional questions of the present and to their historical background. Among the topics discussed are the power of the courts to declare legislation unconstitutional and the problems arising from the exercise of that power; the amendment of constitutions, state and federal, with special reference to proposed amendments; citizenship and naturalization; the interpretation of the fourteenth and fifteenth amendments; problems arising from our insular possessions; treaty-making; and other matters of current significance.

The reading and discussion of special assignments will constitute the work of the course.

S 10. American History. The Middle Period, 1815-1850. Daily except Sat., 10. G. S. 234. Credit, two hours. Professor BRETZ.

A general treatment of the period indicated above, with the emphasis upon expansion and upon the social conditions resulting from the occupation of the Mississippi Valley. Attention will be paid to the development of political parties and party practices. The work will consist of lectures, discussions, and reference readings. The text used is C. R. Fish, *The Development of American Nationality*.

American History. Seminary. Sat., 9-11. For students qualified for research. Consult Professor BRETZ. G. S. 235.

[S 11. **American History. The Period of Civil War and Reconstruction, 1846-1875.**

Special attention is given to new historical literature, biographies, memoirs, and published source material. The problems of the decade before the war, of the war, and of reconstruction are treated in the light of the present. The controversy over slavery is followed to its conclusion and attention is paid to the new national and industrial life created by the war. The problems of reconstruction and the political results of the policy of reconstruction are discussed in some detail.] Not given in 1921.

[S 12. **American History. The expansion of the United States across the Alleghany Mountains, 1750-1848.**

This course deals with the exploration of the trans-Alleghany country, the movement of population into the West, Indian wars and relations with foreign powers on the frontier, territorial acquisitions, land policy, industrial development of typical communities, and in general with the social life of the new communities between the Alleghanies and the Mississippi. The plan is to supplement in some detail the customary treatment of American History and to emphasize the characteristic features of westward expansion.] Not given in 1921.

S 17. **Contemporary History** and its teaching in the secondary schools. Daily except Sat., 8. G. S. 264. Credit, two hours. Professor HICKMAN.

This course deals with the history of Europe since the war. The topics studied are the Peace Treaty; the conferences of the premiers; the conferences of the ambassadors; the League of Nations; England; France; Italy; Germany; Austria; Hungary; Czechoslovakia; Jugoslavia; and Poland. Both in method and in content the course will be useful to teachers in secondary schools, especially such as teach the courses in world history prescribed by the new history syllabus of the University of the State of New York.

LATIN

The courses in Latin offered during the Summer Session are primarily intended for:

1. teachers of Latin in secondary schools who desire an independent presentation of the Latin language, its history, its development, and its use as a colloquial language and as a means of artistic literary expression;
2. students who have a considerable familiarity with Latin literature and who desire a course not usually given in the undergraduate curriculum;
3. students who are beginning or are continuing their candidacy for the Master's degree.

S 1. **The Orations of Cicero.** Daily except Sat., 8. G. S. 120. Credit, two hours. Mr. REBERT.

Primarily intended for teachers of Latin in secondary schools; the content and the historical setting of the orations against Catiline with detailed interpretation of two of the orations and a more rapid reading of the others; syntax and syntactical terminology in the preparatory work.

S 2. Elementary Latin Composition, Syntax, Pronunciation, etc. Practical exercises and drill. Primarily for teachers that feel the need of careful review for the work of their classes. Daily except Sat., 11. G. S. 120. Credit, two hours. Professor DURHAM and Mr. REBERT.

The interpretative part of course S 1 along with course S 2 may be taken by students that have not completed the usual entrance requirements, and in this way, credit for one unit in entrance Latin may be secured.

S 3. Advanced Latin Composition and Oral Latin. Daily except Sat., 9. G. S. 128. Credit, two hours. Professor DURHAM and Mr. REBERT.

S 4. Tacitus: Agricola, Histories, Annals. Selections from Tacitus with particular reference to his literary style. Primarily for graduate students, candidates for the Master's degree; qualified students not candidates for an advanced degree will also be admitted. Daily except Sat., 10. G. S. 128. Credit, two hours. Professor DURHAM.

Those who wish to begin their candidacy for the degree of Master of Arts are requested to correspond in advance with Professor Durham and to bring with them at the opening of the Summer Session such credentials of undergraduate work leading to the degree A.B. as will entitle them to admission to the Graduate School.

MATHEMATICS

In addition to the courses noted below, each teacher will have a daily office hour for consultation with students. It is urged that this opportunity be utilized by all concerned.

In the following list, courses S 1 to S 7 (2) are the equivalent of those having the same numbers in the Announcement of the College of Arts and Sciences for 1920-1921.

Courses S 1, S 2, S 3 are planned for those teachers in the secondary schools who wish to review these subjects. They are equivalent to the advanced entrance requirements of Cornell University and of the College Entrance Examination Board. They presuppose a ready knowledge of elementary algebra (through quadratic equations) and of plane geometry. University credit for S 1, S 2, S 3, S 4, three hours each.

S 1. Solid Geometry. Daily, 11. White 27. Professor SHARPE (Office hour, 9, White 29). White 28. Mr. MORSE (Office hour, 9, White 29).

S 2. Advanced Algebra. Daily, 9. White 24. Professor SNYDER (Office hour, 11, White 26). White 6. Assistant Professor HURWITZ (Office hour, 10, White 8). White 2. Assistant Professor CRAIG (Office hour, 11, White 4).

S 3. Trigonometry. Daily, 10. White 27. Professor SHARPE (Office hour 9, White 29). White 28. Mr. MORSE (Office hour, 9, White 29).

S 4. Analytic Geometry. Daily, 10. White 2. Assistant Professor CRAIG (Office hour, 11, White 4).

Students taking S 5 or S 7 (2) are requested to take no other University work during the session without special permission.

University credit for S 5, S 7 (2), five hours each.

S 5. Differential Calculus. Daily, 8 and 11. White 9. Mr. VANDIVER (Office hour, 10, White 11). White 28. Dr. REED. (Office hour, 10, White 29). White 10. Assistant Professor CARVER (Office hour, 9, White 12).

S 7 (2). Differential and Integral Calculus (Second term's work of Course 7). Daily, 8 and 11. White 2. Assistant Professor OWENS (Office hour, 10, White 4).

Advanced Courses

S 62. Projective Geometry. Daily, 10. White 24. Credit, three hours. Professor SNYDER (Office hour, 11, White 26). The principles underlying projective forms of the first and second degrees will be developed. Although no knowledge of mathematics beyond plane geometry will be presupposed, additional training is highly desirable.

S 42. Analysis. Daily, 11. White 6. Credit, three hours. Assistant Professor HURWITZ (Office hour, 10, White 8). A knowledge of the calculus is presupposed. The content of the course will vary from year to year, according to the needs and desires of the students. Correspondence from possible applicants for the course will be welcome. The subjects to be treated will generally be selected from the following list: elementary differential equations, theory of algebraic equations, theory of limits and logical foundations of the calculus, theory of point-sets, infinite series, theory of functions of a complex variable.

Reading and Research Courses

In addition to the preceding courses, the teachers of mathematics offer the following opportunities to graduate students. Instruction will consist of conferences by appointment, direction of reading, and proposing definite problems for research.

Algebraic curves and surfaces. Problems in correspondence and birational transformations. Professor SNYDER.

Applied mathematics. Problems in Hydrodynamics. Heat, Electricity, and Elasticity. Professor SHARPE.

Foundations of geometry and problems in synthetic geometry. Assistant Professors CARVER and OWENS.

Advanced analysis. Problems in the theory of functions, differential equations, and integral equations. Assistant Professor HURWITZ.

Functions of a complex variable. Assistant Professor CRAIG.

MECHANICS OF ENGINEERING

S 20. Mechanics. This course is the equivalent of M 5 of Sibley College or C. E. 20 of the College of Civil Engineering. Prerequisite, integral calculus. Eleven recitations and two computing periods (of two and a half hours each) a week. Recitations in two sections, either 8 and 11, or 9 and 12. Computing periods to be arranged. Credit, five hours.

S 21. Mechanics. This course is the equivalent of M 6 of Sibley College or C. E. 21 of the College of Civil Engineering. Prerequisite, the equivalent of S 20. Eleven recitations and two computing periods a week. Recitations in two sections, either 8 and 11, or 9 and 12. Computing periods to be arranged. Credit, five hours.

The two courses S 20 and S 21 are so arranged as not to conflict. Students may therefore take part of S 20 and part of S 21 at the same time, and thus make up almost any deficiency in Mechanics.

A student taking either course for the first time may not take any other work, unless permission to do so is granted him by the instructor in charge or by the class adviser of his college.

The courses are open to students from other universities subject to the same requirements for admission as are made for Cornell students. Such students should bring with them official credentials from their universities showing that they have met the requirements for admission to the courses in question.

Classes are held in Lincoln Hall. See bulletin board, north end of Main Hall, at opening of Summer Session. Office room, 33a. Assistant Professors RETTGER, SWITZER, and CORNELL, and Mr. HOWELL.

For further information concerning the Mechanics of Engineering, for the coming Summer Session, write to Professor E. W. Rettger, 321 Mitchell Street, Ithaca, N. Y.

MUSIC

The courses offered by the Department of Music are primarily intended for the training of supervisors of music in public schools, normal schools, and colleges. A special course is offered for the training of directors of instrumental music in the schools.

The Department also offers normal courses for piano teachers. Exceptional advantages for the study of voice, piano, organ, theory, and eurhythmics are afforded to students who desire to specialize in one or more of these branches.

Students are admitted to the Department of Music only on application to Professor Hollis Dann. Conditions of admission, application blank, and other important information concerning the courses may be found in the special announcement of the Department, which will be sent on application.

Admission of students in other departments of the Summer Session cannot be promised in advance, and is possible only to such classes as are not filled by the students taking Music exclusively.

First year courses are designated A; Second year B; Third year C; Fourth year D.

Sight Reading—A. Daily except Sat., 12.10. Miss WOODY.

Sight Reading—B. Daily except Sat., 10.10 and 12.10. Professor HOERNER.

Sight Reading—C. A home-study course.

Dictation—A. Daily except Sat., 9.10. Mr. OSBURN.

Dictation—B. Daily except Sat., 9.10 (two sections). Credit, two hours. Professor HOERRNER and Miss WHITE.

Dictation—C. Daily except Sat., 9.10. Credit, two hours. Miss WISENALL.

Material and Methods—B. Daily except Sat., 10.10 or 11.10. Miss SANFORD and Miss WHITE.

Material and Methods—C. Daily except Sat. 10.10. Professor DANN.

High and Normal School Music—D. Daily except Sat., 12.10. Professor DANN.

Principles and Methods of Education—D. Daily except Sat., 11.10. Professor MORSE.

Practice Teaching—C. Daily except Sat., 11.10. Miss SANFORD.

Practice Teaching—D. Daily except Sat., 9.10. Miss WOODY.

Elementary Theory. Daily except Wed. and Sat., 2.15. Mr. THOMAS.

Harmony—A. Daily except Sat., 11.10. Miss WISENALL.

Harmony—B. Daily except Sat., 12.10. Credit, two hours. Miss WISENALL.

Melody—C. Daily except Sat., 12.10. Credit, two hours. Mr. JOHNSTONE.

Melody—D. T Th, 11.10. Credit, one hour. Mr. JOHNSTONE.

Chorus—A and B. Daily except Sat., 8.00 (two sections). Mr. CAREY and Mr. OSBURN.

Advanced Chorus. Daily except Sat., 8.00. Professor DANN.

Conducting—C. T F, 2.15. Miss HALL.

Conducting—D. M W F, 10.10. Mr. BRAUN and Mr. OSBURN.

Orchestra and Band Methods—C. M Th, 2.15. Mr. MATTERN.

Violin Classes. Elementary and Advanced. See special announcement.

Song Interpretation—B. T F, 2.15. Mr. JOHNSTONE.

Song Presentation and Repertoire—B. M Th, 2.15. Mr. CAREY.

Voice Training—D. M T Th, 2.15. Mrs. HUNT.

Musical Appreciation. M T Th, 3.15. Miss WILLIAMS.

Community Music (Elective). F, 3.15. Miss SANFORD, Miss WILLIAMS, Miss WOODY, Mr. BRAUN, Mr. CAREY, Mr. MATTERN, and Professor DANN.

Posture—Breath Control—Health (Elective). Hours to be announced. Conference by appointment. Miss TODD and Miss COLWELL.

Dalcroze Eurhythmics. Daily except Sat., 10.10. Additional classes to be announced. Miss HALL.

History of Music and Current Events—C. A home-study course.

History of Music and Current Events—D. A home-study course.

COURSE FOR DIRECTORS OF INSTRUMENTAL MUSIC

Violin Class—A. Daily except Wed. and Sat., 3.15. Mr. STUBER and Miss DYE.

Violin Class—B. Daily except Sat., 9.10. Mr. MATTERN.

Advanced Violin Class. (Elective). Daily except Sat., 11.10. Mr. MATTERN.

Viola, Cello, and Bass. (For beginners). Daily except Sat., 12.10. Mr. STUBER.

Wood-Wind Instruments. Daily except Wed. and Sat., 2.15. Mr. STUBER.

Brass and Percussion Instruments. Daily except Wed. and Sat., 3.15. Mr. MATTERN.

Instrumental Practice Teaching. Daily except Sat., 10.10. Mr. MATTERN and Mr. STUBER.

Orchestra and Band Methods—C. M Th, 2.15. Mr. MATTERN.

Orchestra Material and Conducting. T F, 2.15. Mr. MATTERN.

Orchestration. M Th, 2.15. Mr. JOHNSTONE.

Summer Session Orchestra (Elective). T Th, 7.30 p. m. Mr. MATTERN.

NORMAL COURSES IN PIANO TEACHING

(Progressive Series of Piano Lessons)

I. Daily except Sat., 9.10, and 12.10. Credit, four hours. Mr. JOHNSTONE and Mr. BRAUN.

II. Daily except Sat., 10.10. Credit, two hours. Mr. JOHNSTONE and Mr. BRAUN.

PHILOSOPHY

The courses are intended to be of general rather than of technical interest. Candidates for the degree of Master of Arts who have chosen Philosophy as a major or a minor subject will find it advisable to take some of these courses as a basis and preparation for more advanced study. Such students will be given individual guidance in their reading.

S 1. Philosophical Ideas in Nineteenth Century Literature. Daily except Sat., 9. G. S. 225. Credit, two hours. Professor ALBEE.

This course does not presuppose previous acquaintance with philosophy. After considering the general tendency of eighteenth century thought and the movement inaugurated by Rousseau, the course will deal with the interpretations of life offered by well-known authors of the nineteenth century, English, Continental, and American, and the relation of such interpretations to the recognized tendencies of contemporary philosophy.

S 2. Moral Ideas and Ideals. Daily except Sat. 10. G. S. 225. Credit, two hours. Professor THILLY.

This course will trace the development of the moral consciousness from early times to the present, and examine the basal problems in their connection with the history of civilization.

S 3. The Development of Modern Philosophical Thought. Daily except Sat., 11. G. S. 225. Credit, two hours. Professor ALBEE.

Only the most important philosophers of the modern period will be dealt with, but the attempt will be made to connect the development of modern philosophy with literary, scientific, political, and social movements.

S 4. Ethics. Daily except Sat., 12. G. S. 225. Credit, two hours. Professor THILLY.

A study of ethical principles and of their application in the different fields of individual and social life.

S 5. Seminary for Graduates. Weekly meeting at an hour to be arranged, and individual conferences with students who have chosen Philosophy as a major or minor subject in candidacy for an advanced degree. Professor CREIGHTON.

PHYSICAL EDUCATION

Students desiring to elect courses offered by the Department of Physical Education in the College of Agriculture should correspond with or consult Mr. Laurence S. Hill, Caldwell Hall 282. For descriptions of courses see p. 56.

Swimming and Fencing.

Instruction in swimming and life saving; and in fencing for individual training and for teaching will be given at hours to be arranged for each applicant by appointment.

For this instruction a special charge is made: for swimming, \$10; for fencing \$5, including outfit.

Gymnasium costume and slippers (without heels) will be advisable for fencing.

For women, Sage College Gymnasium. 10-12 a. m., 3-6 p. m. For men, Armory Gymnasium, by appointment. Mr. GÉLAS.

PHYSICS

Teachers may enter any course that they are prepared to pursue with profit and are entirely at liberty to take portions of courses if such an arrangement is to their advantage.

COURSES IN INTRODUCTORY AND GENERAL PHYSICS

Those who have not had college physics are advised to take course S 3.

S 3. Introductory Experimental Physics. Credit, six hours. This course is intended to furnish a basis for all following courses as well as to give a fairly complete survey of general physics. Teachers and others familiar with the elements of the subject may find the course useful and instructive.

Lectures and Recitations: The lectures are accompanied by experimental demonstrations. Kimball's *College Physics* will be used for reference. Lectures

daily, 8; recitations, daily, 9; quiz, M, 10-12. Rockefeller A. Professor GIBBS.

Laboratory: Three two-hour laboratory periods a week. Section A, M, 2-4 and T Th, 10-12; Section B, W F, 10-12 and Th, 2-4. Rockefeller 220. Assistant Professor HOWE and Mr. PERRINE.

S 4. Magnetism and Electricity. Recitations. The work in this course will presuppose a knowledge of introductory physics such as may be obtained in a first course in college physics. Credit, two hours. Daily except Sat., 12. Rockefeller 105. Mr. COLLINS.

S 7. General Physics. Recitations and problems. Prerequisite Physics 2 or its equivalent and trigonometry. Six recitation periods and one quiz period a week. Credit, three hours. Recitations, daily 12; quiz period, M, 8, or as arranged. Rockefeller 107. Mr. JOLLIFFE.

S 10. Physical Experiments. This course may with profit be taken by teachers of elementary physics who wish a teaching familiarity with introductory laboratory work.

The fundamental physical laws and constants are studied, partly from the qualitative, partly from the quantitative point of view. The work may be varied to suit the needs of the student, since the instruction is in all cases individual. Credit, one hour. M W F, 10-12.30. Rockefeller 220. Mr. PERRINE.

S 11b. Heat and Light. Recitations. Theory and problems covering thermometry, change of state, kinetic theory, thermodynamics, and physical and geometrical optics. It is recommended that Physics S 14 be taken simultaneously with Physics S 11b. Prerequisite Physics S 3 or its equivalent and the differential and integral calculus. Daily except Sat., 8. Rockefeller 106. Credit, two hours. Assistant Professor BIDWELL.

S 14. Physical Measurements. Primarily for teachers and students who wish a thorough introduction to the theory and methods of physical measurements and observations either as a preparation for graduate study or as an extension of previous work in physics. The methods of setting up and adjusting apparatus, the study of sources of error and their elimination, methods of computation, the interpretation of results both analytically and graphically, have special emphasis.

The instruction is individual and the topics covered may be adjusted to meet the needs of the student. Credit, one to four hours. Prerequisites: the equivalent of eight hours of college physics (unless Physics S 11b be taken simultaneously) and a knowledge of the elements of calculus. One to four three-hour periods each week. M W F, 9-12 (or 10-1 by special arrangements) and T Th, 2-5. Rockefeller 252. Assistant Professor BIDWELL and Mr. HYATT.

INTERMEDIATE COURSES

The sequence of courses outlined below is intended to run through three summer sessions. The schedule for the next three summers is

1921	S21 and S23a
1922	S22a and S23b
1923	S22b and S20

The courses are of the same general character as the corresponding courses given in the fall and spring terms but include somewhat fewer topics. The selection of these topics will be influenced by the interests and needs of the class. Either half of the divided courses, S22 and S23, may be taken without the other.

To profit by these courses a student should have a knowledge of calculus and should have completed courses in general physics covering the principal topics of the subject and of a grade substantially equivalent to that of Physics S 4, and should have had courses in physical measurements substantially equivalent to Physics S 14. If he has not had sufficient laboratory experience he may complete this requirement by taking Physics S 14 simultaneously. A student who contemplates electing any of these courses is advised to correspond with the department about his preparation for the work.

Courses S 20 to S 25 may be taken for credit toward a master's degree in Physics, subject to the requirements of the graduate school. (See Announcement of the Graduate School).

[S 20. **Heat.**] Not given in 1921.

S 21. **Light.** Geometrical optics: thick lenses, optical instruments, stops. Wave theory of light: interference, dispersion, polarization. Credit, two hours. Daily except Sat., 12. Rockefeller C. Assistant Professor HOWE.

[S 22a. **Electricity and Magnetism.** Static electric and magnetic fields; direct current phenomena; gaseous, electrolytic, and metallic conduction; chemical and thermal electromotive forces.] Not given in 1921.

[S 22b. **Electricity and Magnetism.** Electromagnetism, variable current phenomena, electric oscillations.] Not given in 1921.

S 23a. **Properties of Matter.** Dynamics of particles and rigid bodies, terrestrial and universal gravitation. Credit, two hours. Daily except Sat., 8. Rockefeller C. Assistant Professor MURDOCK.

[S 23b. **Properties of Matter.** Elasticity, surface tension, dynamics of fluids; viscosity.] Not given in 1921.

S 25. **Advanced Laboratory Practice.** This course is open to students who have had Physics S 14 (four hours of credit) or its equivalent. It is intended to meet the requirements of the following students: those wishing to take up special topics for detailed study; those taking course S 21 or S 23a and desiring to supplement that work in the laboratory; those who wish to develop their laboratory technique in preparation for research. Credit varies with the amount of work done. The laboratory will be open daily except Sat., 9-12. Rockefeller 301. Mr. COLLINS and other members of the staff.

ADVANCED COURSES

Courses S51, S52, and S53 are intended to meet the needs of students who desire in a brief period to make an intensive study of the more important and fundamental fields of theoretical physics. It may be expected that one of these courses will be offered each summer.

Subject to the requirements of the graduate school (See Announcement of the Graduate School), these advanced courses may be taken for credit toward a doctor's degree in physics.

[S 51. **Theoretical Physics.** Mechanics.] Not given in 1921.

S 52. **Theoretical Physics.** Lectures, discussions, and problems in parts of electricity and magnetism selected to meet the needs of the class. Five hours a week as arranged. Credit, two hours. Assistant Professor KENNARD.

[S 53. **Theoretical Physics.** Optics.] Not given in 1921.

S 75. **Special Topics for Investigation.** Students who are prepared to profit by the use of the library and laboratory facilities of the department in the study of some special topic or in investigation will be given an opportunity to do so. This work may be taken in connection with or independently of any of the above courses and will be under the direction of one or more members of the staff with whom frequent conferences should be arranged. Credit varies with the nature and amount of work done.

For further information regarding opportunities for research and investigation during the Summer of 1921 see the Announcement of the Graduate School.

On each Wednesday evening will be held a conference at which recent developments in physics will be discussed. Whenever feasible, experimental demonstrations will be shown and every effort will be made to give opportunity for open and free discussion.

PSYCHOLOGY

S 1. **Psychology.** Lectures: M T W Th, 9. Professor TITCHENER. Recitations: F, 9, Assistant Professor DALLENBACH, Dr. HOISINGTON, and Dr. BISHOP. G. S. Room C. Credit, two hours.

This course furnishes a general introduction to the study of the normal human mind from the experimental point of view. It opens with a brief discussion of the nature of a scientific psychology, of the problems which such a psychology is called upon to face, and of the methods at its disposal for their solution. It then sets forth in order the facts and laws of mental life as indicated by experiment, beginning with sensation, image, and affection; it passes by way of attention, perception, association, and memory to the highly complex processes of imagination, voluntary action, and thought. Throughout the work use will be made of the unique collection of demonstrational apparatus which composes the equipment of a special laboratory in Goldwin Smith Hall.

Textbook: Titchener, *Textbook of Psychology*.

S 2. **Attention.** Daily except Sat., 10. G. S. Room C. Credit, two hours. Assistant Professor DALLENBACH.

In this course the applications of Attention to advertising, to conjuring and sleight of hand, to hypnosis, to testimony, to efficiency, and to learning will receive special emphasis. The applications will, however, be made only after the student has been grounded in the elementary facts and laws of Attention. The development, the conditions, the kinds, and the levels of Attention will first be considered; then the experimental investigations will be reviewed; and thereafter the practical considerations will be taken up.

Demonstrations and class-experiments will be used frequently for illustration. No textbook will be prescribed, but the lectures will be supplemented by assigned readings in standard works.

S 3. Memory and Learning. Daily except Sat., 8. G. S. Room C. Credit, two hours. Dr. HOISINGTON.

The chief topics to be treated in this course are: the general nature of memory; the curve of learning; the conditions of impression, association, recall, and recognition; the correlation between different memories and between memory and other mental functions; teaching and the presentation of material; recitation and examination; "cramming" and efficient study; unusual memories and their conditions; the formation and the breaking of habits; mnemonic schemes and the "training" of memory.

Demonstrations and class-experiments will be made throughout the course. Readings will be assigned in standard texts and monographs to be found in the library.

S 4. Qualitative Laboratory. M W F, 2.00-4.30. Psychological Laboratory, Morrill Hall. Credit, two hours. Dr. HOISINGTON and Dr. BISHOP.

The purpose of this course is to furnish the student training in psychological method, and to give him a first-hand acquaintance with the contents of his own mind. The laboratory consists of twenty-seven rooms on the upper floors of Morrill Hall, including dark rooms, workshops, and offices. The equipment on the side of apparatus is especially complete, embracing besides the standard pieces for qualitative experiments a great variety of special instruments. The equipment of the research laboratory is also available for demonstrations. Experiments will be performed in vision, audition, and the other departments of sense, in feeling, attention, perception, and idea, and toward the end of the work the student may carry out experiments upon the more complex processes of association and action. The textbook is Titchener's *Experimental Psychology*, vol. i, Qualitative Student's Manual.

S 5. Quantitative Laboratory. Three afternoons (to be arranged), 2.00-4.30. Psychological Laboratory, Morrill Hall. Credit, two hours. Assistant Professor DALLENBACH.

This course aims to furnish such training in the psychophysical methods and in the handling of instruments of precision as will be adequate preparation for research problems. The student will make experimental determinations of the stimulus limens, will attempt verifications of Weber's Law in various departments of sense, and will perform at least one experiment by each one of the chief psychophysical methods. Quantitative experiments in special fields may be undertaken in so far as time permits. The textbook is Titchener's *Experimental Psychology*, vol. ii, Quantitative Student's Manual.

Laboratory partnerships must be formed if the work of this course is to be pursued with profit. If, therefore, a partner cannot be found, the student is recommended to register in course S 6.

S 6. Experimental Problems. Hours and credit to be arranged. Psychological Laboratory, Morrill Hall. Assistant Professor DALLENBACH, Dr. HOISINGTON, and Dr. BISHOP.

Courses S 1 and S 4, or their equivalents, are prerequisites for this course. The work will consist of the original study of certain experimental problems, and will involve both observation and manipulation of instruments. Completed investigations may be published in *The American Journal of Psychology*

S 7. Prolegomena to Systematic Psychology: Advanced Course. Daily except Sat., 11. G. S. Room C. Professor TITCHENER.

This course presupposes S1 and S4 or their equivalents. The aims, status, and general problems of systematic psychology will be discussed in some detail, with numerous references for collateral reading. A knowledge of French and German is desirable.

PUBLIC SPEAKING—ORAL ENGLISH

In the courses described below individual instruction will be given by appointment without additional charge.

S 1. Public Speaking. Daily except Sat., 11. G. S. 21. Credit, two hours. Mr. CAPLAN.

A practical training for speaking in public. High school teachers will find the methods applicable to their work in public speaking and oral English. Original speeches, selections, extemporaneous speeches. Methods of preparation discussed and illustrated. Regular students passing this course are admitted to second term of Public Speaking.

S 2. Voice Training. Daily except Sat., 10. G. S. 21. Credit, one hour. Assistant Professor MUCHMORE.

Exercises for the development of pure tone, flexibility, melody and strength of voice, clear enunciation, and for relief from high, strained tones, harshness, throatiness, and speaker's sore-throat. Private appointments: the voice will be tested; if needed, special exercises will be prescribed. The course necessarily includes training for poise and ease of action. The relation of the voice in conversation, teaching, and public speaking to health is emphasized. This course is fundamental for teachers of Speech Training.

S 2a. Advanced Voice Training and Speech Correction. Prerequisite, S 2, or its approved equivalent, and the consent of instructor. M W F, hour to be arranged. G. S. 26. Credit, one hour. Assistant Professor MUCHMORE.

Readings in the science underlying voice-training and speech-correction. For those having sufficient background to do somewhat independent work. Students may be required to take S 2.

S 3. Course for High School Teachers. Daily except Sat., 8. G. S. 21. Credit, two hours. Assistant Professor HUNT.

Speech-making, oral English, debate, methods of teaching, planning of high school courses. Students taking course S 3 are advised to elect other courses in the department, and in such cases their work will be adjusted to the needs of the individual. Registered auditors may attend on Tuesday and Thursday.

S 4. Oral Reading. Daily except Sat., 12. G. S. 21. Credit, two hours. Assistant Professor MUCHMORE.

Primarily to help teachers of literature and oral English, but open to all students. The first part of the course will be devoted to the elements of reading: attention, individualization, and sequence of ideas; the second part to the oral interpretation of literature, with special emphasis on the spirit rather than the form. Each member of the class will have private appointments, and will prepare

individually at least one extended selection. Regular students who pass this course are admitted to the second term of Oral Reading, course 10.

S 5. The Production of School Plays. Daily except Sat., 9. G. S. 26. Credit, two hours. Consent of instructor necessary for admission. Professor DRUMMOND.

To give teachers sufficient knowledge of play-production to meet the growing demand in the schools for dramatics that have an educational value. Theory of stage direction, choice of plays, elements of training, staging of plays, and other practical phases of production. Sufficient familiarity with suitable dramatic literature will be required. A wide selection of practical helps will be available. Auditors may register for Tuesday and Thursday only. One act plays rehearsed. Students in S 5 should also take S 4 or S 2.

S 6. Seminary. For graduates. Hours to be arranged. Consult Professor DRUMMOND.

For the study of special subjects in the rhetoric, psychology, literature, and history of public address. (See Announcement of the Graduate School.)

S 7. Round Table Discussions. M W F, at hour to be arranged. No credit. G. S. 21. Open only to students regularly registered in courses in the Department.

Discussion of teachers' problems in oral English, public speaking, debate, speech defects, dramatics, methods, and texts. Regular programs will be announced. Register with Mr. CAPLAN.

Public Speaking. (Physical Education S 14.) Assistant Professor HUNT. For registered students in Physical Education. See p. 59.

ROMANCE LANGUAGES

FRENCH

S 1. Elementary Course. Daily except Sat., 8 and 12. G. S. 290. Credit, four hours. Mr. ROUX.

Entrance credit, one unit.

The object of this course is twofold: first, to give beginners a thorough drill in the essentials of French pronunciation, grammar, and reading; second, to offer to teachers an opportunity of studying the methods of presentation of these subjects to beginners.

S 2. Intermediate Course. Daily except Sat., 8 and 12. G. S. 283. Credit, four hours. Mr. WADSWORTH.

Entrance credit, one unit. Prerequisite Course S 1 or its equivalent.

S 3. Advanced Course. Daily except Sat., 8 and 12. G. S. 227. Credit, four hours. Mr. ATWOOD.

Entrance credit, one unit. Prerequisite course S 2 or its equivalent.

S 4. Advanced Translation. Daily except Sat., 9. G. S. 290. Credit, two hours. Prerequisite course S 3 or its equivalent. Mr. WADSWORTH.

S 5. Elementary Composition and Conversation. Daily except Sat., 11. G. S. 290. Credit, two hours. Prerequisite course S 3 or its equivalent. Mr. ATWOOD.

[S 10. **French Poetry.** Daily except Sat., 10. G. S. 277. Credit, two hours.

Lectures on contemporary French poetry and "explications de textes," with outside reading and reports.] Not given in 1921.

S 14. **Advanced Composition and Conversation.** Daily except Sat., 9. G. S. 283. Credit, two hours. Professor GUERLAC.

Rapid translation from standard English texts into French; frequent theme-writing; short talks by the student on history and literature; conversation exclusively in French.

S 17. **Contemporary French Drama.** Daily except Sat., 11. G. S. 283. Credit, two hours. Professor GUERLAC.

Lectures in French on French dramatic literature from 1850 to 1920, with outside reading, reports, and talks by the students.

S 19. **Oral Composition.** Daily except Sat., 9. G. S. 221. Credit, two hours. Professor MASON.

A study of oral composition from the point of view of the teacher of French. Some attention will be paid to the use of phonetics and phonetic transcription in the teaching of oral composition. The course will be conducted partly in French.

S 20. **Contemporary French Literature.** Daily except Sat., 11. G. S. 221. Credit, two hours. Professor MASON.

Lectures and discussions of special topics in contemporary literature, with extensive outside reading and reports.

S 30. **The Teaching of French.** Daily except Sat., 10. G. S. 221. Credit, two hours. Mr. ROUX.

French Readings. A series of readings in French will be given by those in charge of Les Maisons Françaises daily except Saturday at 2.15 p. m. in the Drawing Room of Sage College.

French Lectures. A series of lectures in French dealing with French national life will be given by the members of the instructing staff in French on Wednesday evenings at 8 o'clock in Goldwin Smith, Room 290.

Les Maisons Françaises. The Sill Cottage and the Craig Cottage, both situated on the Campus and convenient to Sage College, have been reserved for students of French. Each house will be in charge of a French lady and there will be abundant opportunity for conversation in French. There will be also at Sage College special tables where only French will be spoken.

SPANISH

S 1. **Elementary Course.** Daily except Sat., 8 and 12. G. S. 277. Credit, four hours. Mr. HESPELT.

Entrance credit, one unit.

S 2. **Intermediate Course.** Daily except Sat., 8 and 12. G. S. 281. Credit, four hours. Mr. SHERWELL.

Entrance credit, one unit.

S 3. Advanced Course. Daily except Sat., 8 and 12. G. S. 124. Credit, four hours. Mr. RIVERA.

Entrance credit, one unit.

S 4. Advanced Translation. Daily except Sat., 9. G. S. 281. Credit, two hours. Mr. HESPELT.

Rapid translation of modern novels and plays. Special attention will be devoted to idiomatic usage and there will be outside reading for practice in reading for content.

S 5. Elementary Composition and Conversation. Daily except Sat., 11. G. S. 281. Credit, two hours. Mr. SHERWELL.

This course is conducted in Spanish.

S 7. Advanced Composition and Conversation. Daily except Sat., 11. G. S. 277. Credit, two hours. Mr. RIVERA.

Special attention will be given to free composition and correspondence. The course is conducted in Spanish.

S 10. Masterpieces of Spanish Literature. Daily except Sat., 9. G. S. 277. Credit, two hours. Professor KENISTON.

A brief survey of Spanish literature through a study of representative works. Lectures, outside reading, reports, and discussions.

S 30. The Teaching of Spanish. Daily except Sat., 10. G. S. 281. Credit, two hours. Professor KENISTON.

A course for the discussion of materials and methods in the presentation of Spanish in the secondary schools. Special attention will be given to phonetics, class-room methods, the choice and use of texts, and auxiliary materials.

Spanish Lectures and Readings. A series of lectures and readings in Spanish by members of the instructing staff will be given during the session.

Spanish Table. There will be in Prudence Risley Hall, in charge of one of the members of the instructing staff, a special table at which only Spanish will be spoken. Further opportunities for conversation will be offered through entertainments by students in the Department.

SHOP WORK

S 7. Pattern Making. Use of woodworking tools; elements of pattern making. Daily, 8-11 or 9-12. Daily except Sat., 2-5. Mr. ———.

S 10. Machine Work. Instruction in the operation of various standard machine tools; use of measuring and hand tools; fitting and assembly. Daily, 8-11 or 9-12. Daily except Sat., 2-5. Professor WELLS.

STRUCTURAL ENGINEERING

The following courses are the same as those given in the School of Civil Engineering during the college year. For further information about the content of any course or about the assigned hours communicate with Professor E. N. BURROWS.

C.E. 270. Structural Design and Bridge Stresses. Credit, four hours, Prerequisite, Mechanics 20. One-fourth of the course includes structural detail, i. e., the design of a wooden roof truss and of other timber joints. The remainder

of the course includes dead load, live load, wind load, and impact stresses in simple bridge trusses due to uniform live panel loads, locomotive axle loads, and road roller loads. This course is equivalent to first term C.E. 71. Lectures, recitations, computations, and drawing at hours to be assigned. Lincoln Hall 14 and 29. Assistant Professor BURROWS.

C.E. 271. **Structural Design.** Credit, three hours. Prerequisite, Mechanics 20 and first term 71. This is an elementary course in Steel Design. Lectures, computations, and drawing. Complete design, detail drawings, bill of material, and estimate of weight of a steel roof truss, a through and deck plate girder bridge. This course is the same as second term C.E. 71. At hours to be assigned. Lincoln Hall 14. Assistant Professor BURROWS.

C. E. 274. **Bridge Design.** Elective. Seniors and graduates. Credit, three hours. Prerequisite, course 271. Computations and drawing for the complete design of a riveted railroad bridge of six or seven panels, the stresses for which were computed in connection with the previous study of bridge stresses. The computations to determine the sections of all members and of pins, pin plates, splices, and other details as well as of connecting rivets are to be written up in the form of systematically arranged reports. The drawing consists of general detail plans showing the location of all rivets as well as the composition and relation of all members and connections. The final reports are to give a full list of shapes and plates, and a classified analysis of weight for the span. Textbook: Merriman and Jacoby's *Roofs and Bridges*, Part III. Computation and drawing. Assistant Professor BURROWS.

C. E. 280. **Concrete Construction.** Credit, three hours. Prerequisite, courses 20 and 21. Concrete materials, properties of plain concrete, its making and deposition. Elementary theory of reinforced concrete as applied to columns, rectangular beams and slabs, T-beams and beams reinforced for compression. Direct stress combined with flexure. Laboratory work includes the making and testing of columns, beams, and bond specimens. Recitations, laboratory, and computing periods. Assistant Professor URQUHART.

C.E. 282. **Concrete Design.** Elective. Seniors and graduates. Credit, three hours. Prerequisite, course 280. This course may be substituted for Engineering Design, course 91. Applications of the theory of reinforced concrete to the design of various types of retaining walls. Selective problems in the design of reinforced concrete structures such as buildings, sewers, etc. Reports and drawings. Assistant Professor URQUHART.

C.E. 283. **Reinforced Concrete Arch.** Seniors and graduates. Elective. Credit, three hours. This course may be substituted for Engineering Design, course 91. Prerequisite, courses 20 and 21, and the first part of course 271. The design of an arch of reinforced concrete including its abutments and centering. The general form and proportions are determined by two preliminary investigations. The final investigations of the arch ring are made in accordance with the elastic theory, the live loading for maximum unit-stresses in the arch ring, as well as the direction and magnitude of abutment thrusts, being determined by means of influence lines. The design is supplemented by several illustrated lectures on the different types of concrete arch bridges of recent construction, their principal details, methods of erection, and influence on design. Textbook: Hool's *Reinforced Concrete Construction*, Vol. III. Lectures, computation, and drawing. Assistant Professor BURROWS.

STATE COLLEGE OF AGRICULTURE

OFFICERS

Albert William Smith, M.M.E., Acting President of the University.
Albert Russell Mann, B.S.A., A.M., Dean of the College of Agriculture, Director of the Experiment Station, and Director of Extension.
George Alan Works, Ph.B., M.S.A., Professor of Rural Education, in charge of the Summer School.
Robert Pelton Sibley, A.B., M.A., L.H.D., Professor and Secretary.

STAFF OF INSTRUCTION

Arthur Augustus Allen, Ph.D., Assistant Professor of Ornithology.
Elsa Guerdum Allen, A.B., Assistant in Ornithology.
Cora E. Binzel, Acting Professor of Rural Education.
Harold Eugene Botsford, B.S., Assistant Professor of Poultry Husbandry.
Orville Gilbert Brim, B.Ped., M.A., Ph.D., Professor of Rural Education.
Frances Artie Brookins, Associate Director of Costume Shop, Home Economics.
Julian E. Butterworth, A.B., Ph.D., Professor of Rural Education.
T. J. J. Christian, Major, F. A., Reserve Officers' Training Corps.
George Harris Collingwood, B.S., A.M., Assistant Professor of Forestry.
Anna Botsford Comstock, B.S., Professor of Nature Study.
Lewis Josephus Cross, B.A., Ph.D., Professor of Chemistry in its Relations to Agriculture.
John D. Detwiler, B.A., M.A., Instructor in Entomology.
Marjorie Dunn, Specialist in Physical Education, Public Schools, Albany, N. Y.
Theodore Hildreth Eaton, A.B., A.M., Ph.D., Professor of Rural Education.
Paul W. Eckley, B.A., Assistant, Department of Physical Education, and Freshman Coach, Cornell University.
Emery N. Ferriss, Ph.B., Ph.D., Assistant Professor of Rural Education.
Emma K. Pitts, Director of Physical Education, Girls' High School, Albany, N. Y.
A. Leah Gause, Assistant in Nature Study.
Adele Lewis Grant, B.S., M.A., Assistant in Botany.
Richard F. Hayes, Director of Physical Education, Public Schools, White Plains, N. Y.
L. O. Heinold, Scout Executive, Ithaca Council.
Laurence S. Hill, B.S., Director of Physical Education, Public Schools, Albany, N. Y.
Hugh Cecil Hunter, B.S.A., Assistant in Entomology.
Everett L. Hunt, B.A., Assistant Professor of Public Speaking.
Frances Beatrice Hunter, B.S., Assistant Professor of Home Economics.
Edmund Hutchinson, B.P.E., Assistant, Department of Physical Education.
Mack M. Jones, B.S. in E.E., Assistant Professor of Rural Engineering, University of Missouri.
Olney Brown Kent, B.S., Ph.D., Professor of Poultry Husbandry.
Paul Krimmel, G.G., Supervisor of Physical Education, Public Schools, Syracuse, N. Y.
Paul J. Kruse, A.B., Ph.D., Professor of Rural Education.
Paul B. Lawson, A.B., A.M., Ph.D., Assistant Professor of Biology, University of Kansas.
Eva May Luse, B.A., M.A., Head of Department of Teaching, Iowa State Teachers College.
Carolyn Brundage McIlroy, Director of Costume Shop.
M. S. Markie, Ph.D., Professor of Botany, Earlham College.
Lila Alice Minns, B.S., M.S. in Agr., Instructor in Floriculture.

Helen Monsch, B.S., M.A., Assistant Professor of Home Economics.

Winifred Moses, B.S., Assistant Professor of Home Economics.

Irene M. Murphy, A.B., Instructor in Physical Education.

E. Laurence Palmer, A.B., M.A., Ph.D., Assistant Professor of Rural Education.

Sidney Parsons, Assistant Physical Director, Brooklyn Training School, Brooklyn, N. Y.

Miles D. Pirnie, Assistant in Ornithology.

Joseph Pullman Porter, B.S., M.S.A., M.L.D., Extension Instructor in Landscape Art.

Harold A. Pratt, Instructor in Floriculture.

Frank Elmore Rice, A.B., Ph.D., Assistant Professor of Chemistry in its Relations to Agriculture.

Louis Michael Roehl, B.S., Assistant Professor of Farm Shop Work.

Flora Rose, B.S., M.A., Professor of Home Economics.

George H. Russell, Assistant in Nature Study.

Henry William Schneck, B.S., M.S.A., Assistant Professor of Vegetable Gardening.

Grace Smith, Instructor in Physical Education, City Grammar Schools, Rochester, N. Y.

Rolland Maclaren Stewart, A.B., Ph.D., Professor of Rural Education.

William Alonzo Stocking, M.S.A., Professor of Dairy Industry.

James Lewis Strahan, B.S., M.S., Professor of Rural Engineering.

Martha Van Rensselaer, A.B., Professor of Home Economics.

William Perrine Van Wagenen, A.B., Student, Harvard Medical College.

Annette J. Warner, Professor of Home Economics.

Grace L. Waterman, Director of Physical Education, Emma Willard School, Troy, N. Y.

Cass Ward Whitney, B.S., Instructor in Rural Organization.

Wilford Murry Wilson, M.D., Professor of Meteorology.

George Alan Works, Ph.B., M.S.A., Professor of Rural Education.

Isadore Yavits, A.B., Assistant Director of Physical Education, Boys' High School, Albany, N. Y.

COURSES IN THE COLLEGE OF AGRICULTURE

The New York State College of Agriculture provides courses of instruction under the rules and regulations that follow:

1. **Admission.** The Summer School in the College of Agriculture is designed to meet the needs of persons engaged in educational work, such as teachers, supervisors, superintendents, extension workers, and others concerned with activities of an educational nature.

Persons enrolling for courses in Physical Education should make certain by correspondence or conference that they have sufficient academic preparation so that they will be eligible for a recommendation to certification upon the completion of their study.

2. **Tuition and Fees.** Tuition in any of the courses following is free to admitted students who are residents of New York State and who have been so for at least one year. Others will pay a tuition fee of \$40, whether one subject or more is taken. For the time and place of payment, see page 8.

In some of the courses a fee to cover the cost of materials used will be charged. An incidental fee of five dollars is charged all students in physical education.

Fee cards must be procured from the instructor at the first exercise, and returned to him receipted within five days.

3. For special announcement regarding Physical Education see page 56.

4. **Academic Credit for Work.** For the requirements for the degree B.S. (eight terms, 120 hours, etc.) see the Announcement of the College of Agriculture.

Summer Term. Advanced and research courses are offered in many departments of the College in a twelve weeks term beginning in the latter part of June. See separate announcement.

ANIMAL HUSBANDRY

S 1. **General Elementary Course in Animal Husbandry.** Credit, four hours. Lectures, daily at 10. Practice, daily at 2. Animal Husbandry and Judging Building. Professor HARPER.

The general principles of breeding and feeding farm animals, with practice in formulating rations, and in judging and scoring.

BACTERIOLOGY

S 1. **Bacteriology.** Credit, two hours. Lectures, T Th, 9. Dairy Building 222. Laboratory, M W F, 2-5. Dairy Building 122. Professor STOCKING.

A general course in bacteriology covering the general characteristics of bacteria, methods of study, and their relation to the sanitary and economic phases of agriculture. This course is given by the Department of Dairy Industry and is especially designed for teachers of agriculture, botany, and biology. Laboratory fee, \$3.

BIOLOGY

S 1. **General Biology.** Credit, three hours. Lectures and recitations, daily except Sat., 11. Roberts Hall 392. Laboratory and field work, M W F, 2-4.30; other sections by special appointment. Roberts Hall 302. Assistant Professor LAWSON.

This is a course designed to acquaint the general student and the prospective teacher with the main ideas of biology through selected practical studies of the phenomena on which biological principles are based. Lectures, laboratory work, and field trips will deal with such topics as: Interdependence of organisms as illustrated by insects and flowers, insects and galls, etc.; the simpler organisms, such as amoeba, paramoecium, flagellates, and other protozoans and algae; fungi, bacteria, and slime molds among plants. The study of these simpler organisms will be followed by studies of such plant types as liverworts, mosses, and ferns, and such animal types as hydra, earthworm, and frog.

Prospective teachers will be given an opportunity to acquaint themselves with methods of collecting and preparing material for class use. If there is a sufficient demand, a one-hour conference each week will be arranged for students in the course who are interested in the discussion of special problems in the teaching of biology.

Students completing this course will be given credit for the first term work in Biology I of the regular academic year. Laboratory fee, \$2.50.

BOTANY

The courses in botany are planned to meet the needs of high school and college teachers, as well as to furnish information for persons not intending to teach.

The work will consist of lectures, laboratory work, and field work. The lecture and class-room work will be supplemented by lantern slides, charts, microscopic, museum, and herbarium material. It is likely that some round table discussions will be arranged.

The region about Ithaca is especially rich in plant life. Rarely, if ever, is a locality found that is better adapted for summer field work in botany. The richness of the fungous and the algal floras, as well as the great number of mosses, liverworts, ferns, and flowering plants, render field work here especially attractive and valuable. Special attention is given to the field botany, although other phases of the work are not ignored.

The country in the vicinity of the University is very diversified; marshes, fields, woodlands, ravines, and bogs all being accessible for day trips. Many short field trips will be taken and three longer all-day trips. The all-day trips will occur on Saturdays and will entail an extra expense of \$1 to \$2 for each. Women will find the bloomer or knickerbocker costume desirable for field work.

In addition to the laboratory fee in each course a deposit of \$2 will be required from each student to whom a vasculum or other special apparatus is assigned.

S 1. Elementary Botany. Credit, three hours. Lectures, M W, 8. Laboratory, M W, 9-1, F, 8-1, with additional reading or field work. Botanical Laboratory, Stone Hall. Professor MARKLE.

Representative plants from all the larger plant groups will be studied. Emphasis will be placed on structure and life history with particular attention to evolutionary relationship. Some attention will be given to the economic aspects of the different groups, and to their adaptation to surroundings. Attention will also be given to the special morphology of the higher plants. Field work will replace laboratory hours to a limited extent and some all-day trips will be required.

A general course planned as an introduction to the study of botany and as a preparation for advanced courses. It is intended also to cover certain phases of college entrance requirements and of general secondary school botany. This course is conducted mainly in the laboratory. Field trips will replace laboratory hours to a limited extent only. Laboratory fee, \$3.50.

S 4. Identification, Classification, and Ecology of the Higher Plants. Credit, two hours. Prerequisite: some training in structural botany, either previously or in connection with this course. Lectures, Th, 8. Laboratory or field, T, 8-1, Th, 9-1. Botanical Laboratory, Stone Hall. Mrs. GRANT.

A comprehensive study of the wild flora about Ithaca, with reference to the practical recognition of species and varieties as well as to the floral and foliar characteristics of these species and to the grouping of them into genera, families, and more comprehensive groups. The course consists of field and laboratory work, but is supplemented by general discussions and lectures on the broader questions of classification, nomenclature, distribution, and habitat. The ecological association and modifications of the various species and varieties will be noted. The course is intended to supply teachers and others with a general knowledge of the flora. Some all-day trips are required. Supplementary instruction will be given in the preservation of material for the museum and for the herbarium.

If necessary this course will be divided as follows: A. For those beginning this type of work. B. For students who already possess some knowledge of the flora. Laboratory fee, \$2.50.

S 5. Trees and Shrubs. Credit, one hour. Prerequisite: some training in structural botany, either previously or in conjunction with this course. Lectures, Th, 2. Laboratory or field work, T Th, 3-5. Stone Hall. Professor MARKLE.

A course intended for those who desire more concentrated work on the woody plants of our flora than can be obtained in course S 4. The aim is to familiarize the student with as many as possible of the trees and shrubs in the Cayuga Lake flora, their floral and foliar characters, their structure, methods of growth, habits, and distribution. Much of the work will be in the field, supplemented by laboratory practice, lectures, and demonstrations. Some all-day trips are required. Laboratory fee, \$1.50.

CHEMISTRY

S 85. Agricultural Chemistry, General Course. Credit, two hours. Prerequisite, Introductory Chemistry. Lectures, daily except Sat., 9. Caldwell Hall 100. Professor CROSS.

The relation of chemistry to agriculture, and an introduction to the study of the composition and chemical properties of plants, fertilizers, feedstuffs, insecticides, and fungicides.

S 86. Agricultural Chemistry, Introductory Laboratory Course. Credit, two hours. Prerequisite, Chemistry 6 (qualitative and quantitative analysis), or its equivalent. M T W Th, 2-5. Caldwell Hall 250. Assistant Professor RICE.

Methods for making tests and the simpler analyses of plant materials, feedstuffs, soils, fertilizers, insecticides, and fungicides, with the end in view of giving the student a clear knowledge of their chemical composition and behavior. Recitations are held during laboratory periods.

S 72. Chemistry of Foods and Food Products. Credit, two hours. Prerequisite, Introductory Chemistry; should be preceded also by a course in Organic Chemistry. Lectures, daily except Sat., 11. Caldwell Hall 100. Professor CROSS.

The chemical composition, chemical properties, and methods of manufacture of the principal foods and food products. Methods for the determination of the normal constituents of foods. Special attention is given to the chemistry of milk and milk products, cereal products, sugars, fruits, and fruit products.

S 102. Chemistry of Foods, Elementary Laboratory Course. Credit, two hours. Prerequisite, Introductory Chemistry; should be preceded also by a course in Organic Chemistry. M T W Th, 2-5. Caldwell Hall 250. Assistant Professor RICE.

The chemistry of proteins, fats, carbohydrates, potable water, baking powders, jellies, syrups, butter, oleomargarine, olive oil, salad oils, cheese, milk, food preservatives, artificial coloring, flavoring extracts, habit-forming agents, tooth powders, and so forth. Recitations are held during laboratory periods.

S 103. Chemistry of Foods and Food Products. Laboratory Course. Credit two hours. Prerequisite, Chemistry 6 and 32 (or, preferably, Chemistry 7, 12, and 30). M T W Th, 2-5. Caldwell Hall 250. Assistant Professor RICE.

This is designed as a beginning laboratory course for students expecting to take further work in the chemistry of foods. The conventional "complete" analysis of carbohydrate foods is made. Examination and analysis of proteins, fats, carbohydrates, soaps, baking powders, jellies, syrups, butter, oleomargarine, olive oil, salad oils, cheese, milk, artificial coloring, flavoring extracts, and so forth.

S 116. Special Topics and Research. Students desiring special advanced work in soils, fertilizers, insecticides, fungicides, foods, dairy products, feeding stuffs, condimental stock feeds, etc., or those taking research should register for this course. One to three hours may be taken. Consult Professor CROSS or Assistant Professor RICE not later than registration day.

ENTOMOLOGY

S 4. Elementary Morphology of Insects. Credit, three hours. Laboratory open daily except Sat., 8-5; Sat., 8-1. Twenty-one hours of laboratory work a week required. Roberts Hall 391. ———.

An introductory laboratory course required of all students who plan to do advanced work in entomology. Laboratory fee, \$2.

S 5. Elementary Systematic Entomology. Credit, two hours. Fifteen hours of laboratory work a week required. Must be preceded or accompanied by course S 4. Laboratory open daily except Sat., 8-5; Sat., 8-1. Roberts Hall 391. ———.

Practice in the identification of insects and in the method of phylogenetic study as illustrated by their wing venation. With course 4, required of all students who plan to do advanced work in entomology. Laboratory fee, \$3.

Members of the Summer Session may attend, in Roberts 392, Professor Matheson's long-term course in General Entomology (Course 3: Lecture, W F, 9) without credit.

FLORICULTURE

S 1. Garden Flowers. Credit, one hour. Lectures, M W F, 8. Laboratory, F, 2-4.30. Greenhouses. Miss MINNS.

This is designed as an elementary course to be of value in home flower garden or school garden work. It is outlined so as to acquaint students with the most valuable material for this work, and to cover methods of propagation and culture.

S 2. Indoor Flower Growing. Credit, one hour. Lectures, T Th, 11. Laboratory, T, 2-5. Greenhouses. Mr. PRATT.

The propagation and culture of plants suitable for winter gardens in school rooms, including a study of containers, soils, fertilizers, insecticides, are the basis of this course. The selection of varieties of bulbs and their methods of culture indoors are also considered, as are also the method of propagation and general care of species of plants suited for indoor culture.

FORESTRY

S 1. The Tree and the Forest. Credit, one hour. Lectures, T Th, 10. Field work, M, 2-4.30. Forestry Building 122. Assistant Professor COLLINGWOOD.

This course lays emphasis on simple means of identification of the principal forest trees. It includes a study of the characteristics of forest trees and forests; identification of and notes on the commercial use of a few of the principal kinds of wood; the life history of the forests and other facts fundamental to the right use of forests.

S 2. Forests and Forestry. Credit, two hours. Lectures, M T W F, 8. Field Work, Th, 2-4.30. Forestry Building 122. Assistant Professor COLLINGWOOD.

Topics to be considered are: the nature and scope of forestry; its branches and the methods employed in perpetuation of forests; the economic usefulness of forests to the nation, including influence on stream-flow and the relation of the forest to recreation; brief description of the forest regions of the United States; what is being done in Federal, State, and private forestry.

So far as possible the lectures of each week will be followed by practical observation lessons in the field, which will afford opportunities to see the application of the principles discussed in the lectures.

HOME ECONOMICS

The courses in Home Economics are planned to meet the needs of teachers in rural schools and colleges and extension workers. For entrance requirements see p. 47. The courses in methods of teaching are given in the Department of Rural Education and description of these courses will be found under that heading.

S 3a. Introductory Course in Foods, Part I. Credit, five hours. Lectures, daily except Sat., 8. Home Economics Building 245. Practice, daily except Sat., 9-1. Home Economics Building 200. Assistant Professor MOSES.

This course parallels the regular course in foods and will be accepted as equivalent to the first term's work in Foods 3. Laboratory fee, \$15.

S 3b. Introductory Course in Foods, Part II. Credit, four hours. Prerequisite S 3a. Lectures, daily except Sat., 9. Home Economics Building 245. Practice, daily except Sat., 10-1. Home Economics Building 205. Assistant Professor ———.

This course parallels the regular course in foods and will be accepted as equivalent to the second term's work in Foods 3. Laboratory fee, \$15.

Courses for establishing a fundamental knowledge of foods. The lectures will include a discussion of the composition and characteristics of foodstuffs; sources and methods of manufacture of foods; principles of selection and methods of preparation of foods; preservation of foods; conservation of foods; comparative nutritive and economic values of various foods. Laboratory practice will be given in applying scientific principles to food-preparation.

S 4. Dietetics. Credit, three hours. Lectures and recitations, daily except Sat., 9. Home Economics Building 100. Laboratory practice, T Th, 2-5.30. Home Economics Building 200. Written reviews for those wishing credit in the course, Sat., 9. Professor ROSE and Assistant Professor MONSCH.

This course will include a discussion of the fundamental principles of nutrition as they apply to the human being; the practical means of applying scientific principles in planning dietaries; special problems of nutrition, as the feeding of infants and children. The laboratory work will consist of exercises in estimating the comparative cost and nutritive value of various foods; in planning and judging various types of dietaries, in preparing typical meals. Open only to students who have had course S 3 or its equivalent. This course does not parallel the regular course and is not accepted as a substitute from regular students. Laboratory fee, \$7.50.

S 31. Nutrition of School Children. Credit, two hours. Prerequisite S 4 or its equivalent. Lectures and recitations, M W, 11. Home Economics Building 100. Laboratory practice, M W F, 2-5. Home Economics Building 205. Open only to students expecting to teach. Assistant Professor MONSCH.

The nutrition of the school child and ways of improving it will be considered. Laboratory work will be conducted among groups of children of school age. Laboratory fee, \$5.

S 50. Lunch Room Management. Credit, four to seven hours. Only graduates of courses in Home Economics or persons having successful practice in the management of food service for large numbers and practical knowledge of food preparation will be admitted to this course. Before registering, candidates must give satisfactory evidence of their ability. Daily from 7 a. m. to 7.30 p. m. with intervals of rest. Home Economics Cafeteria. Assistant Professor ———.

An intensive course for training managers of school lunch rooms, cafeterias, or similar institutions. The course will include lectures, demonstrations, and laboratory practice in management and organization, systems of accounting, purchasing, marketing, and storage, quality judging of raw and cooked products, planning, preparing, and serving food in large quantity. The cafeteria conducted by the School of Home Economics will be used as a laboratory. Laboratory fee, \$10.

S 60. Clothing and Textiles, Introductory Course. Credit, three hours, Practice, daily except Sat., 8-10.30. Home Economics Building 300. Lectures. M W F, 12. Home Economics Building 100. Number of students limited to fourteen.

This course includes hand and machine sewing, the use of commercial patterns, drafting and designing of patterns, household mending, and simple embroidery. A cooking apron, a combination suit, a lingerie blouse, and a petticoat are made. The work consists of demonstrations, discussions, and practice. Students provide all materials, subject to the approval of the instructor. Estimated expense, \$10 to \$12. Laboratory fee, \$3.

S 61a. Dressmaking, Survey Course. Credit, two hours. Prerequisite course S 60 or its equivalent. Practice, daily except Sat., 8-10.30. Home Economics Building 300. Miss HUNTER.

This course includes the designing and making of patterns, and the designing and making of a simple afternoon dress in cotton, a wool skirt, and an over-blouse. Each student prepares her own dress form.

The work consists of demonstrations, discussions, and practice. Students provide all dress materials, subject to the approval of the instructor; estimated cost of dress materials, \$10. Laboratory fee, to cover cost of laboratory materials, \$3.

S 70a. Constructive Costume Design. Credit, two hours. Prerequisite S 60 or its equivalent and elementary design. Practice, daily except Sat., 2-5. Home Economics Building 300. Miss HUNTER.

This course includes a study of the fundamental principles of design as expressed in modern costume. Students develop these principles by means of paper, materials, and blackboard sketching. Designing is done with flat patterns and through draping. Open only to students expecting to teach. Estimated expense, \$8.

S 75. Commercial Clothing Instruction. Credit, two to four hours. Prerequisite or parallel S 70a. Open only to students preparing to teach. Prerequisites, courses S 60, S 61a, 101a, or the equivalent. Laboratory practice by arrangement. Home Economics Costume Shop, Home Economics Building. Mrs. McILROY and Miss BROOKINS.

This course considers problems of dressmaking and shop management. The students work under instructors experienced in commercial practice. Dress-making problems in construction, fitting, finishing, designing, and in meeting customers are considered. The shop is equipped as a typical shop with a number of paid workers; hence an opportunity to work out problems in shop organization and management.

S 80. Elementary Millinery. Credit, two hours. Prerequisite S 60 or its equivalent. Practice, daily except Sat., 10.30-1. Home Economics Building 305.

This course considers the methods and manipulation in the construction of hat frames out of wire, buckram, willow, and crinoline; the use and renovation of old materials; the preparation of trimmings; the study of color, shape, and trimmings as to suitability, becomingness, and income; comparison with commercially-made hats. Students provide all materials for hats; estimated cost, \$6 to \$10. Laboratory fee, to cover cost of laboratory materials, \$3.

S 120a. Household Management. Credit, two hours. Lectures, daily except Sat., 8. Home Economics Building 100. Professor VAN RENSSELAER and others.

S 160. Extension in Home Economics. Credit, two hours. Prerequisite, graduation from accredited courses in Home Economics or the equivalent. Lectures, M W F, 10. Home Economics Building 265. Practice, T Th, 2-5. Home Economics Building 265. Professor VAN RENSSELAER and others.

This course will include a study of the plans for extension work in New York State and in other typical states; legislation, both State and Federal, promoting extension work; programs for developing county extension work; state and other agencies already at work and the possibilities of co-operating with them. Problems in the formation of councils, working committees, project groups, office organization, and management; means of securing funds; publicity. Opportunity will be given for work and observation in the field. Laboratory fee, \$5.

S 161. Projects for Extension Workers in Home Economics. Credit, two hours. Prerequisite, courses in food study, dietetics, and clothing construction. Lectures, T Th, 10. Home Economics Building 265. Practice, M W F, 2-5. Home Economics Building 265.

A course designed to give to the extension worker practice in organizing home economics projects for individuals or groups. Special attention will be paid to projects for nutrition classes, and school lunches. Suitable subject-matter for club programs. Study groups and extension schools will be outlined; material for field use will be collected; recent subject-matter on nutrition and clothing will be reviewed. Opportunity will be given for observing project work in the field. Laboratory fee, \$5.

The following sequence of subjects is recommended for persons desiring to train themselves for extension positions:

1. Rural Education S 2 (educational psychology); see p. 66.
2. Rural Organization S 1; see p. 69.
3. Home Economics S 160.
4. Home Economics S 161.

The person desiring to prepare herself for extension work in Home Economics should have a pleasing personality, executive ability, maturity of judgment, adaptability; should have good fundamental training in Home Economics; should be interested in people; and should have good health.

LANDSCAPE ART

S 3. Landscape Planning and Planting. Credit, one hour. Lecture, F, 9. Practice, Th, 2-5; F, 10-1. Landscape Art Building. Mr. PORTER.

A discussion of the principles underlying simple arrangements and planting in home grounds, school grounds, and village-improvement work.

The course will consist of lectures to illustrate fundamental principles and of practice and field trips to observe land conditions; making small surveys; preparing simple plans; learning the common plants and utilizing them in planting practice.

METEOROLOGY

S 1. Meteorology and Climatology. Credit, two hours. Lectures and discussions, daily except Sat., 10. Roberts Hall 292. Professor WILSON.

This course is adapted to the needs of teachers and students of subjects in which weather and climate are important factors, particularly teachers of physical geography and general agriculture. It is designed to acquaint the student with the laws governing the primary and secondary circulation of the atmosphere and with the development, progression, and conditions that attend cyclones, tornadoes, and other atmospheric phenomena.

Attention is given to the principles and practice of weather forecasting from weather maps and from local observations.

S 2. Meteorology and Climatology, Laboratory Course. Credit, one hour. T Th, 2-5, or other periods to be arranged. Must be accompanied by Course S 1. Dairy Building 341. Professor WILSON.

The work consists in the study of the principal weather and climatic elements with the aid of maps, charts, and instruments. The various meteorological instruments will be studied, as well as the methods of taking and recording the observations.

NATURE STUDY

S 1. General Nature Study. Credit, two hours. Lectures, M W F. 10. Field and laboratory observations, T Th, 10-12; 2-4.30. Roberts Hall 302. Professor COMSTOCK, Assistant Professor PALMER, Mr. RUSSELL, Miss GAUSE.

The object of this course is to train teachers in making personal observations along several lines of nature study and to give them a foundation for carrying on the work independently. As many as possible of the laboratory periods will be spent in the fields in the study of birds, trees, and plants. Special attention will be given to observing the relation of insects to flowers of field and garden. The lectures will supplement the field and laboratory work, and will also present practical methods for conducting nature study in the grades.

S 2. Elementary Science in the High School. Credit, one hour. Lectures, M W, 11. Place to be announced. Assistant Professor PALMER. This course is equivalent to course 63 given in the spring term. It is designed to help high school science teachers in the organization of their material, to help them to know how to introduce scientific ideas to high school students, and to point out to teachers useful sources of information and supply. Only high school science teachers or students who have had course S 1 are eligible.

S 3. Nature Literature. Credit, one hour. Lectures M W, 11. Place to be announced. Only those who have had course S 1 are eligible. A course in nature-study reference books and nature literature. Professor COMSTOCK.

S 4. Friends and Enemies of the Garden. Credit, two hours. Lectures, T Th, 8. Laboratory and field work, M W F, 9-11. Place to be announced. Mr. DETWILER.

This course is designed especially as an aid to teachers of gardening. It deals with common garden insects and their natural foes. The laboratory periods are devoted to a personal study of the life-histories of insects. The methods employed may be used in nature-study lessons supplementary to school gardening.

S 5. **The Nature Essayists and Poets.** Credit, one hour. Lectures and conferences, T Th, 12. Place to be announced. Professor COMSTOCK.

ORNITHOLOGY

S 1. **Ornithology.** Credit, three hours. Lectures, M W F, 11. McGraw 5. Laboratory, M W, 2-5 or T Th, 2-5. Field work, M W, or T Th, 5.30-8 a. m. or 8-10.30. Assistant Professor ALLEN, Mrs. ALLEN, and Mr. PIRNIE.

This course is designed as an introduction to the study of birds and a knowledge of the common species. The lectures will discuss such subjects as classification, migration, coloration, song, nest-building, eggs, care of young, methods of attracting birds, economic importance, etc. The laboratory practice with bird skins will give an intimate knowledge of the birds of Eastern North America and familiarity with the use of a manual. The aim of the field work is the identification of birds in their haunts and observations upon their habits. Each student should be provided with Chapman's *Handbook of Birds of Eastern North America* and with field or opera glasses. Laboratory fee, \$2.

S 2. **Applied Ornithology.** Credit, two hours. Lectures, T Th, 11. McGraw 5. Laboratory and field work, T Th, 2-5. Open only to those who are taking the elementary course or who have had its equivalent. Assistant Professor ALLEN.

This course is intended primarily for teachers or students who plan to go further with the study of ornithology. The lectures will discuss the field open to prospective ornithologists, methods of teaching, museum work and the preparation of specimens, bird photography, biological surveys, wild life conservation, and game farming. The laboratory and field work will give practical exercises. Laboratory fee, \$2.

PHYSICAL EDUCATION

Object. Legislation requiring that physical training shall be taught in public schools has created a demand for teachers and supervisors of this subject. There is also need for teachers who can supervise health education, for playground supervisors, and for coaches and athletic directors. In order to assist persons who desire to prepare for work of this kind, the New York State College of Agriculture has designed a schedule of carefully graded courses requiring four summer schools for completion. This arrangement of work enables students, teachers, and supervisors to enter upon a complete and systematic study of physical education until the summer school certificate has been earned. It also enables them to engage in teaching during the year and thus acquire necessary experience.

Tuition. See page 47. Admission to classes is restricted to the duly registered students. All students registered for physical education are required to pay an incidental fee of \$5.

Advanced Standing. Students desiring advanced standing in physical education will be required to send a certified copy of the courses in which they wish to receive credit, with a statement of the amount and character of work accomplished, to Laurence S. Hill, in care of the College of Agriculture, Ithaca, N. Y., at least one week before the session opens, or to pass an examination in those subjects in

which they wish to receive credit. Examinations for this purpose will be conducted in Roberts Hall, July 1, at 9 o'clock.

Certificates. At the end of each summer session a certificate of attendance is issued to all students completing satisfactory work. See page 10. Students desiring to receive the summer school certificate in physical education will be required to complete the work as outlined for the four summer schools or their equivalent. No certificate will be awarded to any student who has not attended at least two full sessions. No student will be admitted to the courses without approval of his program. Students doing satisfactory work will be recommended to the State Department of Education for temporary certificates. Upon the completion of the four years of work, they will be recommended for a permanent certificate in such states as grant these certificates.

Admission. See page 47.

Playground Teachers and Directors:—

For those desiring to equip themselves as playground teachers and directors the following courses are essential:

- Physical Education S 1. Hygiene.
- Physical Education S 4. School Yard Athletics.
- Rural Education S 2. Educational Psychology.
- Physical Education S 21. Physical Diagnosis.
- Physical Education S 33. Pageantry.
- Physical Education S 8. Track and Field Athletics.
- Physical Education S 35. Swimming.
- Physical Education S 30. First Aid.
- Physical Education S 29. Special Methods.

Activities: Games of low and high organization; apparatus; rhythmic steps; folk dancing; English and American country dancing; special features, organized games, and general practice.

Athletic Coaches:—

For those desiring to equip themselves as athletic coaches, the following courses are essential:

- Physical Education S 30. First Aid.
- Physical Education S 29. Special Methods.
- Physical Education S 31. Mechanotherapy.
- Physical Education S 2. First Year Practice.
- Physical Education S 22. Third Year Practice.
- Physical Education S 4. School Yard Athletics.
- Physical Education S 6. Soccer.
- Physical Education S 7. Baseball.
- Physical Education S 8. Track and Field Athletics.
- Physical Education S 9. Hockey and Tennis.
- Physical Education S 10. Football.
- Physical Education S 20. Scouting.

Class-room teachers who wish to become acquainted with playground activities and their direction and supervision, should confer with Mr. Hill regarding the proper courses to meet their special problems.

Costumes. Women *must* provide themselves with all-white middy blouses (no colored collars), black or dark blue bloomers, black *cotton* stockings, black ties, and white tennis shoes.

Men *must* provide themselves with quarter-sleeve tennis or gymnasium shirts, long Y. M. C. A. trousers (blue with white stripe), and white tennis shoes.

Residential halls, rooms, board. See page 10. It is suggested that women students in Physical Education apply for rooms in Sage College, in which one of the gymnasiums is located. Rooms are reserved in the order of application.

FIRST YEAR

S 1. Hygiene. Credit, two hours. Daily, 8. McGraw Hall. Dr. VAN WAGENEN.

The course will consist of lectures, lantern slide and chart exhibits, and practical demonstrations of method. The general laws of health will be discussed, including the essentials of sanitary science, personal hygiene, community hygiene, home hygiene, and the public health movement in general. The recognized divisions of educational hygiene will be considered with special emphasis upon the scope and methods of school medical inspection, school nursing, control of communicable diseases in the schools, operation of school clinics, organization of health clubs, location and treatment of children mentally or physically exceptional or defective, the approach to nutritional problems of school children; and the development of a system of records in the administration of the foregoing lines of health activity.

The work of the school nurse will be considered in detail and the training in practical methods will be of a character to render correlation or actual amalgamation of the duties of the school nurse and the teacher of physical training effective where such fusion may seem desirable.

Special attention will be given to the consideration of rural health problems as they present themselves to a community health leader or organizer. The health problems peculiar to high schools and gymnasiums will also be indicated, with certain aspects of school sanitation of special significance in the daily routine of the worker in health-education.

S 2. First Year Practice. Credit, two hours. Daily except Sat. p. m., 9-11, 3.30-4.30. Gymnasium.

This course includes elementary practice in calisthenics, schoolroom tactics, Swedish gymnastics, rhythmic steps, Indian clubs, wands, dumb-bells, apparatus, tumbling, aesthetic and athletic dancing, and games of low and high organization.

S 3. Histology and Anatomy. Credit, two hours. Lectures and laboratory, daily, 11-1. McGraw Hall. Mr. ECKLEY.

In this course the various tissues and organs of the human body will be studied briefly in their minute structure in the laboratory. This work will be supplemented by lectures illustrated with charts and lantern slides. Demonstration of specially prepared microscopic sections including a brief consideration of embryology will be included.

Anatomy in its gross aspect will be presented through the medium of charts, models, diagrams, lantern slides, museum preparations, and living models, the chief purpose being to familiarize the student with the anatomy of the body as it presents itself to the teacher of physical training.

S 4. School Yard Athletics. Credit, one hour. Daily except Sat., 2.30. Gymnasium and Athletic Field. Mr. HUTCHINSON.

(a) Group Athletics:

In this course the general idea of group athletics, the badge test, organizations, and athletic meets, with special reference to rural districts, will be taken up and practical demonstrations given.

(b) Conduct of Playgrounds; Construction and Equipment; Games:

This course deals with play programs, how to organize a playground staff, how to plan and construct a playground, its equipment, the field house and the details concerned in playground management, administration of municipal recreation, legislation, budget-making, the relation of recreation executives to the community and its various activities.

SECOND YEAR

Rural Education. Course S 2. Daily except Sat., 8. See page 66.

S 12. Second Year Practice. Credit, two hours. Daily except Sat. p. m., 9-11, 3.30-4.30. Gymnasium.

Second year or intermediate practice includes wands, tactics, Indian clubs, dumb-bells, Swedish gymnastics, tumbling, apparatus, singing games and story plays, aesthetic and athletic dancing, and games of low and high organization.

S 13. Physiology. Credit, one hour. Daily, 11. McGraw Hall. Dr. VAN WAGENEN.

This course will cover the phases of physiology that are essential to the teacher of physical training.

S 14. Public Speaking. Credit, two hours. Daily except Sat., 12. G. S. 26. Assistant Professor HUNT.

Training in correct and effective speech; with particular attention to tone and distinctness of utterance. Brief speeches before the class.

S 15. Anatomy. Review. Credit, one hour. Daily, 2.30. McGraw Hall. Dr. VAN WAGENEN.

THIRD YEAR

S 20. Principles and Practices of Scouting. Credit, one hour. Daily except Sat., 8. Gymnasium. Mr. HEINOLD.

This course is intended to give a general knowledge of the Boy Scout Movement, assisting those who plan to enter the field as Scout Leaders and others interested in boy welfare. Among the subjects to be considered are: the psychology of leadership, camping, signalling, maps and map making, and hiking.

S 21. Physical Diagnosis. Credit, one hour. Daily, 9. McGraw Hall. Dr. VAN WAGENEN.

This course is designed to familiarize the student with methods of physical examination and the modern diagnostic procedures available. The normal will first be demonstrated and then the various departures from the normal will be indicated and discussed. The diagnosis of the diseases and physical defects of

school children will be covered from the practical aspect and with the aim of giving the student a working knowledge of the conditions she will actually face in daily routine as a school nurse or as a teacher of physical training.

Rural Education S 4. Daily except Sat., 10. See page 66.

S 22. Third Year Practice. Credit, two hours. Daily except Sat. p.m., 11-1; 3.30-4.30. Gymnasium.

This course includes advanced work in Swedish gymnastics, tactics, apparatus, Indian clubs, wands, folk dancing, highly organized games such as volley ball, captain ball, and basketball, aesthetic and athletic dancing, and games of low and high organization.

S 24. Kinesiology. Credit, one hour. Daily except Sat., 2.30. Gymnasium Lecture Hall. Mr. HAYES.

This course deals with the principles and mechanisms of bodily movements. The mechanism of representative types of exercise is studied for the purpose of determining, as far as possible, their immediate and permanent effects upon health.

FOURTH YEAR

S 29. Method and Practice of Teaching Physical Education. Credit, two hours. Daily, 8. Demonstrations. Daily except Sat., 2.30. Gymnasium. Mr. HILL.

This course will include the theory of teaching gymnastics and calisthenics, simple gymnastic positions and movements, miscellaneous exercises, gymnasium tactics, and apparatus work; the pedagogical principles involved in calisthenics or drills, the physiological principles, general order of exercise in a drill, factors which should guide in the selection of exercises; how to write a drill and how to plan gymnastic lessons for use in the elementary schools; the principles of posture.

The methods of teaching physical training, observation, and criticism, and the actual presentation of assigned work will be included in this course. Work adapted to rural schools will receive special emphasis. Practice under schoolroom conditions with children of various grades will be offered.

S 30. First Aid. Credit, one hour. M W F, 10. Gymnasium Lecture Hall. Mr. ECKLEY.

The principles and methods of first aid will be fully discussed and demonstrated, stress being placed upon the actual practice by the student of the various procedures under the direct supervision of the instructor. The course will completely cover the requirements of the Red Cross First Aid Certificate.

S 31. Mechanotherapy. Credit, one hour. Daily, 10. Gymnasium Lecture Hall. Miss WATERMAN.

(a) Prescription of exercise: diagnosis, selection, and arrangement of exercise, commensurate with patient's age, strength, general constitution, and mode of living. Exercise for the correction of postural and structural defects.

(b) Massage: principles and application of massage; object of treatment; physiological effects; general rules.

S 32. Fourth Year Practice. Credit, two hours. Daily except Sat. p.m. 11-1; 3.30-4.30.

Work in special features; tactics, apparatus, English country dancing, American country dancing, Indian clubs, highly organized games, interpretative and athletic dancing, wands, are taught in this course, which is for advanced students.

The courses as outlined under First, Second, Third, and Fourth years are required of candidates for the certificate.

Electives

S 33. Pageantry. Credit, one hour. Daily, 2.30. Gymnasium. Miss PARSONS.

Lectures and demonstrations on pageantry. The history of pageantry; its educational and community value; the relation of history, poetry, song, folk lore, and drama to pageantry; the writing, directing, and producing of a pageant; grouping and pageant acting; costuming; the production of a pageant, if conditions permit. The production of small festivals and school celebrations for various occasions. The class will plan original scenes and episodes. Interpretative dancing offered in the fourth year will be closely allied with this course.

S 35. Swimming. Daily, except Sat. Hour to be arranged.

Instruction in swimming, life saving, and resuscitation. The various swimming strokes will be demonstrated and taught. The course is open to a limited number. Special fee, \$10.

Equitation. Daily. Hours to be arranged. Major CHRISTIAN, First Sergeant JENSEN, Sergeants ANDERSON and MCFARLAND and Private CAHILL of the Field Artillery Detachment, Cornell University.

S 36. Elementary Class (Men). Practical equitation and horsemanship; nomenclature; care of horses and of equipment; management of the stable; the seat; the aids; work on the track; posting; cross-country riding.

S 37. Riding Class (Women). A course more elementary than S 36, yet covering much the same ground. Selected mounts.

S 38. Advanced Class. For men who have had experience in riding. The seat; the rein; leg aids; exercises on long lines with and without stirrups; exercises on the circle; posting; the walk, trot, and gallop; jumping; cross-country riding; the care, conditioning, and training of horses.

S 39. Mounted Gymnastics. For all classes. Exercises, mounted and dismounted; the vault, the turn; Roman and Cossack riding; exercises in the indoor riding hall.

COURSES IN ATHLETICS

(Required of candidates for the certificate)

It is not possible for students to complete the following athletic courses in any one summer. Students are asked to choose wisely and extend the work of the afternoon program over three or more years.

S 6. Soccer. Credit, one hour. Daily except Sat. 4.45. Girls' Athletic Field. Mr. HUTCHINSON.

Full instruction is given in soccer, a game similar to field hockey, in which the same formation is used. The game is extremely popular in rural communities.

CORNELL UNIVERSITY SUMMER SCHOOL OF PHYSICAL EDUCATION, 1921

TIME SCHEDULE AND INSTRUCTORS

First Year

NEW ARMORY

- 8:00- 9:00 Special Course for the Teacher of the One-Room School—
(S 40), Miss _____.
- 8:00- 9:00 Hygiene (S 1), McGraw Hall, Dr. Van Wagenen
- 9:15- 9:35 Tactics, M. W. F., Miss Fitts
Gymnastics 1b, T. Th. S., Mr. Krimmel
- 9:35- 9:55 Apparatus, M. W. F., Miss Fitts and Mr. Krimmel
Gymnastics 1a T. Th. S., Miss Waterman
- 9:55-10:15 Apparatus, M. W. F., Mr. Krimmel and Miss Fitts
Tumbling, T. Th. S., Mr. Krimmel
- 10:15-10:35 Dumb bells, M. W. F., Miss Fitts
Wands, T. Th. S., Mr. Hill
- 10:40-11:00 Rhythmic Steps, M. W. F., Miss Parsons
Indian Clubs, T. Th. S., Mr. Hill
- 11:10-12:00 Histology and Anatomy (S 3), Mr. Eckley
Lecture and Laboratory, McGraw Hall
- 12:00- 1:00 Histology and Anatomy (S 3), Mr. Eckley
Lecture and Laboratory, McGraw Hall
- 1:00- 2:30 Hour for luncheon
- 2:30- 3:30 Schoolyard Athletics (S 4), Mr. Hutchinson
- 3:30- 4:00 Aesthetic Dancing, Miss Parsons
- 4:00- 4:30 Athletic Dancing, Mr. Hayes
- 4:45- 5:30 Track and Field Athletics (S 8), Schoellkopf
Women, Miss Fitts; Men, Mr. Hayes
- 4:30- 5:30 Football (S 10), Mr. Eckley

Second Year

OLD ARMORY

- Educational Psychology (R. E. S 2)
Caldwell Hall 100, Professor Luse
- Wands, M. W. F., Mr. Hill
- Tactics, T. Th. S., Miss Fitts
- Indian Clubs, M. W. F., Mr. Hayes
- Dumb Bells, T. Th. S., Miss Fitts
- Singing Games, M. W. F., Miss Parsons
- Gymnastics II, T. Th. S., Mr. Hayes
- Tumbling, M. W. F., Mr. Krimmel
- Apparatus, T. Th. S., Miss Fitts and Mr. Krimmel
- Tumbling, M. W. F., Mr. Krimmel
- Apparatus, T. Th. S., Miss Fitts and Mr. Krimmel
- Physiology (S 13), Dr. Van Wagenen
McGraw Hall
- Public Speaking, (S 14), Professor Hunt, G. S. 26
- Hour for luncheon
- Anatomy Review (S 15), Dr. Van Wagenen, McGraw Hall
- Aesthetic Dancing, Mr. Hayes
- Athletic Dancing, Mr. Hayes
- Soccer (S 6) Mr. Hutchinson
- Athletic Field
- Hockey and Tennis, (S 9), Miss Waterman
- Football (S 10), Mr. Eckley

The letter and number in parenthesis refer to the course as described in the Summer School Announcement.

**Third Year
OLD ARMORY**

- 8:00- 9:00 Scouting, (S 20), Mr. Heinold
- 9:00-10:00 Physical Diagnosis (S 21),
Dr. VanWagenen, McGraw Hall
- 10:10-11:00 Principles of Teaching (R. E. S 4),
Caldwell Hall 100, Professor Stewart
- 11:15-11:35 Tactics, M. W. F., Mr. Hill
- 11:40-12:00 Gymnastics III, T. Th. S., Miss Waterman
- 11:40-12:00 Wands, M. W. F., Mr. Hill
- 12:05-12:25 Indian Clubs, T. Th. S., Mr. Hayes
- 12:05-12:25 Apparatus, Miss Fitts and Mr. Krimmel
- 12:30- 1:00 Basketball, M. W. F., Mr. Yavits
- Folk Dancing, T. Th. S., Miss Fitts
- 1:00- 2:30 Hour for luncheon
- 2:30- 3:30 Kinesiology (S 24), Gymnasium Hall
Mr. Hayes
- 3:30- 4:00 Games, Mr. Krimmel
- 4:00- 4:30 Aesthetic Dancing, Miss Parsons
- 3:30- 4:30 Baseball (S 7), Men, Mr. Eckley
Women, Mr. Hutchinson
- 4:45- 5:30 Soccer (S 6), Mr. Hutchinson, Athletic Field
- Hockey and Tennis (S 9), Miss Waterman
- 4:30- 5:30 Football (S 10), Mr. Eckley

Fourth Year

Special Methods (S 29), Mr. Hill

First Aid (S 30), M. W. F., Mr. Eckley

Special Lectures, T. Th. S., Mr. Coop

Massage (S 31B), M. W. F., Miss Waterman

Prescription of Exercise (S 31A), Miss Waterman

English Country Dancing, M. W. F., Miss Parsons

Tactics, T. Th. S., Mr. Hill

Apparatus, Miss Fitts and Mr. Krimmel

Interpretive Dancing (Women), M. W. F., Miss Parsons

American Country Dancing, T. Th. S., Mr. Hill

Interpretative Dancing, M. W. F., Miss Parsons

Boxing and Wrestling, T. Th. S., Mr. Krimmel

Hour for luncheon

Demonstration School (S 29), Mr. Hill

Pageantry (S 33), Miss Parsons, Gymnasium Hall

Games, Mr. Krimmel

Baseball (S 7), Men, Mr. Eckley,
Women, Mr. Hutchinson

Soccer, (S 6), Mr. Hutchinson, Athletic Field

Hockey and Tennis, (S 9), Miss Waterman

Football (S 10), Mr. Eckley

S 7. Baseball. Credit, one hour. Daily, 3.30. Athletic Field. Mr. ECKLEY.

Theory and field practice. Batting; bunting; fielding; base running; position play; offensive team play; defensive team play; battery strategy; training a school team; base sliding; drawing throw to first, second, or third; hit and run; positions infielders should play; discussion of rules.

S 8. Track and Field Athletics. Credit, one hour. Lectures and practice, daily except Sat., 4.45. Schoellkopf Field. Miss FITTS and Mr. HAYES.

The work consists of the theory and practice of the various track and field events for men and women, such as hurdling, standing and running broad jump, standing and running high jump, racing start, short and long distance running, shot put, baseball throw, and basketball throw. The duties of officials are thoroughly explained, studied, and practised; meets are organized and conducted.

S 9. Hockey and Tennis. Credit, one hour. Alternating days, 4.45. Girls' Athletic Field. Miss WATERMAN.

Full instruction is given in field hockey, a popular athletic game, which affords exhilaration as well as plenty of vigorous exercise. A definite explanation and a thorough study of each rule is made, the advantages and disadvantages of certain plays are fully discussed and demonstrated, and actual participation in competitive games is experienced. In tennis the various strokes, methods of serving and receiving are taught, as well as the advantages of matches and tournaments.

S 10. Football. Credit, one hour. Daily except Sat., 4.30. Gymnasium and Schoellkopf Field. Mr. ECKLEY.

Theory and field practice. Training and demonstrations; discussion of preliminary and fundamental football; pre-seasonal conditioning; falling on the ball; how to hold a ball; punting; place kicking, drop kicking, and goal kicking from touchdown; use of the straight arm; judging and catching punts; kick off—different formations used; positions of play and how to play them; system of signals; generalship; offensive and defensive tactics; teamwork; formations and plays; systems of coaching; discussions of rules.

Basketball. Theory and Practice. This course is offered as part of the Third Year Practice Course, S 22. Mr. YAVITS.

Technique of basket shooting, shooting from the foul line, catching and passing the ball, how to select forwards, centers, and guards; training, formations used, different styles of play, team work, systems of signals, discussion of rules.

Men and women take most of the practical work in common, except the heavier forms of gymnastics and athletics.

S 40. General Course in Calisthenics and Recreation for the Class-room Teacher. Credit, one hour. Daily except Sat., 8. Gymnasium.

Drill in giving response and rhythmic commands, securing responses, graded marching tactics, free gymnastics, mimetic exercises, rhythmical steps, and supervised recreational activities. The various divisions of the State syllabus of physical training and contents will be considered.

POULTRY HUSBANDRY

S 1. Principles and Practice of Poultry Management. Credit, four hours. Lectures, daily, 9. Poultry Building 325. Laboratory, T Th F, 2-4.30, Poultry Building 300. Professor KENT.

Designed primarily for teachers of agricultural high schools and other secondary agricultural schools. The course consists of thirty-six lectures and preliminary examinations, and eighteen laboratory practice periods as they would be taught in one term of the high school, and includes a general discussion and practical application of the principles of incubation; brooding; rearing; feeding; illumination; breeding for constitutional vigor; egg production. Sanitation and disease; marketing; housing; and general poultry farm management. Laboratory fee, \$3.

S 2. Farm Poultry. Credit, one hour. Lectures, M W, 10. Poultry Building 375. Laboratory, M, 2-4.30. Poultry Building 300. Assistant Professor BOTSFORD.

An abbreviated course dealing with the most important principles of Poultry Husbandry and their application on the farm. Laboratory fee, \$1.

S 3. Feeding Practice. Credit, one hour. Must be accompanied by course S 1 or S 2. Practice, three short periods a day, including Sunday, for six weeks; morning, 7.30-8.15; noon, 12.45-1.30; night, 4.30-5.00. Poultry Building. Assistant Professor BOTSFORD.

Practice in feeding for egg production and for fattening; includes preparation for market, record-keeping, and general care and management of fowls. Assigned reading and a written examination will be required. Laboratory fee, \$1.

S 3b. Incubating Practice. Credit, one-half hour. Must be accompanied by course S 1 or S 2. Practice, three short periods a day, including Sunday, for three weeks; morning, 7.30-8.15; noon, 12.45-1.30; night, 4.30-5.00. Poultry Building. Assistant Professor BOTSFORD.

Practice in operating incubators; disinfecting, keeping records, testing eggs, and general management of the hatch. Assigned reading and a written examination will be required. Laboratory fee, \$1.

S 4. Brooding Practice. Credit, one-half hour. Must be accompanied by course S 1 or S 2. Practice, three short periods a day, including Sunday, for three weeks; morning, 7.30-8.15; noon, 12.45-1.30; night, 4.30-5.00. Poultry Building. Assistant Professor BOTSFORD.

Practice in feeding, brooding, and caring for young chicks; keeping of temperature, food, and growth records. Assigned reading and a written examination will be required. Laboratory fee, \$1.

S 5. Marketing Practice. Credit, one-half hour. Must be accompanied by course S 1 or S 2. One hour daily by appointment for six weeks. Poultry Building 100. Assistant Professor BOTSFORD.

Practice in cleaning, testing, grading, packing, and shipping eggs and in preparing poultry for market. Assigned reading and a written examination will be required. Laboratory fee, \$1.

RURAL EDUCATION

Courses S 2, S 4, S 10, S 16, S 17, S 18, S 19, S 22, S 30, S 40, and S 41, are open to all students. Courses S 6, S 7, S 14, and S 20 are limited to students in vocational education. Persons should consult with the instructors in charge of these courses before registering for them.

S 2. Educational Psychology. Credit, two hours. Section I, daily except Sat., 8. Caldwell Hall 100. Section II, daily except S., 10. Farm Management 101. Professors KRUSE and LUSE.

The original nature of man, reflexes, instincts, and inborn capacities; laws of learning and habit formation; acquisition of motor control; practice and improvement; memory; transfer of training; mental fatigue; individual differences.

S 4. Principles of Teaching. Credit, two hours. Daily except S., 10. Caldwell Hall 100. Professor STEWART.

A consideration of the problems of teaching in the light of the principles of education involved, such as motivating study, cultivating interest, organizing materials, selecting and solving problems, drilling, planning class work, questioning, measuring results.

This course is planned primarily for students in Physical Education. Other students should consult the instructor in charge of the course before registering.

S 6. Agriculture in the High School. Credit, two or three hours. Students should consult with the instructor before registering. Lectures and discussions, daily except Sat., 9. Laboratory, T Th, 2-4.30. Caldwell Hall 282. Professor STEWART.

This course deals with the purposes of vocational education, organization of subject-matter, selection of texts, equipment, home projects, and extension activities of the agricultural instructor, with special reference to the department of vocational agriculture in the New York State high school.

S 7. Home Economics in the High School. Credit, three hours. Lectures and discussions, daily, 8-10. Conference hours, Monday and Wednesday, 11. Home Economics 265. Acting Professor BINZEL.

This course includes lectures, discussions, observation of teaching, and teaching. Problems treated; plant and equipment; text books; references; illustrative material; critical study of and preparation of courses of study; home project; school lunch; budgets; relation of home economics department to school and community; review and direct application of educational theories to presentation of subject-matter.

S 10. Educational Measurement. Credit, two hours. M W F, 2-3.30. Caldwell Hall 282. Professor KRUSE.

The need, the means, and the general method of measurement in education; typical tests and scales from the viewpoint of use by the teacher, the supervisor, and the administrator; elementary statistical terms and methods; teachers' marks as measures of school work.

S 14. Teacher-Training Institutions for Teachers of Agricultural Vocations. Credit, two hours. Daily except Sat., 10. Caldwell Hall 282. Professor EATON.

This course will be based upon a study of the work of teachers of agricultural vocations in secondary schools. In the light of such study will be discussed: (1) the demands upon the teacher in terms of capacities and abilities; (2) current and ideal standards of qualification in teachers; (3) the aims, admission requirements, course, content, methods, and administrative organization of institutions for the training of teachers of agricultural vocations.

S 16. Rural Secondary Education. Credit, two hours. Daily except Sat., 2. Caldwell Hall 143. Assistant Professor FERRISS.

A course dealing with basic problems of modern secondary education in its adaptation to rural conditions. Special consideration is given to the junior high school as a practicable form of high-school organization for the rural community. Other guiding topics are: the scope and functions of the secondary school, present demands upon the rural secondary school, the rural senior high school, prevocational and vocational work, educational and vocational guidance, extra-classroom activities, needed forms of extension work in the rural high school, selection of subject-matter and organization of the curriculum.

S 17. The Rural and Village Principalship. Credit, two hours. Daily except Sat., 8. Caldwell Hall 143. Assistant Professor FERRISS.

A course designed primarily for principals of high schools having also the elementary grades and for those preparing for such positions. It deals with such practical problems as: the preliminary organization of the work of the school; the keeping and use of school records; the testing, grading, and promotion of pupils; school government and problems of discipline; direction and control of pupil's activities, pupil guidance, and the supervision of pupil's study; aims and methods of supervision, teachers' meetings; measurement of teachers' efficiency; the problem of school exercises; the principal and the community.

S 18. State and County Educational Administration. Credit, two hours. Daily except Sat., 9. Stone Hall 192. Professor BUTTERWORTH.

Principles of State direction; types of State educational organization; the county unit; district, township, and community types of control; problems of Federal leadership; functions of educational executives; sources of school funds; unit costs; budget making.

S 19. Administrative Problems of District and County Superintendents. Credit, two hours. Daily except Sat., 11. Stone Hall 192. Professor BUTTERWORTH.

This course will consider some of the chief problems of the superintendent as the responsible rural school leader: (1) ideals of such leadership and methods of securing community co-operation in making leadership effective; (2) an evaluation of the legal responsibility and authority of the superintendent; (3) the school plant—measuring it, remodeling old buildings, development of plans for a consolidated school; (4) standard rural schools; (5) problems in the financial support of rural education; (6) consolidation—difficulties, methods, plans for local consolidation surveys; (7) pupil accounting—elimination and retardation in rural schools; an evaluation of New York and other free-tuition and compulsory education laws; (8) a system of records for the rural school administrator; or similar problems according to the needs of the class.

S 20. Administration and Supervision of Vocational Agriculture. Credit two hours. Daily except Sat., 8. Caldwell Hall 143. Professor WORKS.

This course is designed for persons engaged in supervision of vocational agriculture or those planning to enter such work. It deals with administration and supervision of agricultural education under the Vocational Education Act; State legislation, related Federal legislation, curricula. Visits to schools in New York and adjacent states are required as a part of the course.

S 22. Supervision of Rural Schools. Credit, two hours. Daily except Sat., 8. Farm Management 101. Professor LUSE.

This course is devoted to a practical consideration of the district superintendent's problems in supervising rural schools. Such topics as the following will form the content of the course: (a) How can the rural schools be organized so as to accomplish the required work? (b) What is a practical daily program for a one-teacher school with eight grades? (c) How can the rural teacher be helped to use the state course of study effectively? (d) By what means can the teachers' initiative and interest in the work be developed? (e) How can standard tests be used as a means of supervision? The experience of the class, the methods and results in other states, and the best suggestions from principles of education will be utilized to develop practical plans of supervision.

S 30. Problems of Teacher-Training. Credit, two hours. Daily except Sat., 11. Caldwell Hall 143. Professor BRIM.

This course is designed for those who are in teacher-training work or who are preparing for such work. The course will be devoted to a consideration of the practical problems of the rural teacher as these have been expressed by rural teachers in the field and by district superintendents. The training course will be examined with a view to discovering means of preparing teachers successfully to meet these difficulties. The following topics are suggested: problems of school organization and management; the daily program; adjustment of courses of study to rural needs and conditions; preparation of the teacher for community leadership; observation of rural schools as a means of preparation.

S 40. Rural School and the Community. Credit, two hours. Daily except Sat., 3.30-4.30. Caldwell Hall 143. Professor BRIM.

This course is designed for any who are concerned with rural schools. Such topics will be considered as: (a) The place of the school in community life; (b) the teacher's responsibility in community affairs; (c) the necessary knowledge and attitudes for rural leadership; (d) possible means of relating the school and the community so as to vitalize school work and secure better school support and improvement.

S 45. The Theory of Vocational Education. Credit, two hours. Daily except Sat., 12. Farm Management 101. Professor EATON.

The course will consist of discussions of questions arising under the following general heads: The meaning of vocation; its origin and evolution; conservation and progress in economic society; the function of education in vocation; the criteria of content and method in vocational education; the agencies of vocational education.

RURAL ENGINEERING

S 5. Farm Mechanics. Credit, three hours. Lectures, daily except Sat., 9. Caldwell Hall 143. Laboratory, T Th, 2-5. Farm Mechanics Laboratory. Assistant Professor JONES.

A study of the applications of kinematics as illustrated in mowers, grain binders, gas engines, and other farm machinery; the selection, installation, care, and use of pumps, water systems, and internal combustion engines. Laboratory exercises will include rope work and belt lacing.

S 22. Farm Engineering and Structures. Credit, four hours. Lectures, daily except Sat., 12. Caldwell Hall 143. Laboratory M W F. Farm Mechanics Laboratory. Assistant Professor STRAHAN.

A study of leveling instruments and leveling as applied to drainage; elements of plane surveying; the use of concrete and wood in farm buildings; construction and design of farm buildings, including the general-purpose barn, dairy barn, sheep and hog barn, and others as time permits; ventilation, light, and sanitation, with outside problems.

S 41. Farm Shop Work. Credit, one hour. Open to all teachers of vocational agriculture. M W F, 2-5. Farm Mechanics Laboratory. Assistant Professor ROEHL.

A course in farm woodwork and correlated drawing, harness-repairing, and farm metal working to prepare men to handle the general farm shop work of the vocational course in agriculture.

RURAL ORGANIZATION

S 1. The Social Problems of Rural Communities. Credit, two hours. Lectures, reports, and discussions, daily except Sat., 8. Roberts Hall 292. Mr. WHITNEY.

An introductory study of the social problems of rural communities as a basis for the social organization of rural life. Students will make individual studies of selected communities.

S 16. The Place of Play in the Community. Credit, one hour. Lectures, reports, and discussions, T Th S, 9. Roberts Hall 292. Mr. WHITNEY.

The psychology of play activity; the significance of play in relation to the individual; the social value of play as a factor in social training, in social control, and in curricular education; the history of play, including pre-human play, the play of primitive peoples, play in ancient times, in medieval times, and in modern times; types of present-day play and recreation; types of organization now in use.

VEGETABLE GARDENING

S 1. Vegetable Gardening. Credit, three hours. Lectures, M W, 9, T Th F. 8. Poultry Building 350. Laboratory, T Th, 9-12. Vegetable Gardens, East Ithaca. Assistant Professor SCHNECK.

This course is planned primarily to meet the requirements of those interested in school and social service work in vegetable gardening, as well as of the amateur gardener.

A study of the principles and practices of gardening as applied to the culture of vegetables in the home and school garden.

The location, planning, and management of a garden; seed and seed handling; growing early plants; special requirements of the various vegetable crops; and insects and diseases will receive consideration.

The laboratory work includes actual practice in the garden. Each student is assigned a plot on which he will plant and, throughout the course, care for the vegetables which are best suited for school and amateur gardens. Laboratory exercises are planned to show the application of principles and practices discussed in the lectures. Laboratory fee, \$2.

S 2. Advanced Vegetable Gardening. Credit, one hour. Prerequisite, Course S 1. Lectures and laboratory, T Th, 2-5. Poultry Building 325 and Vegetable Gardens, East Ithaca. Assistant Professor SCHNECK.

Lectures on the origin, history, and botany of vegetables. Lectures and laboratory studies of different vegetable types and varieties, their characteristics, and adaptation to different conditions. Important varieties of all the different vegetables are grown in the garden giving an abundance of material for study. Preparing and judging exhibits. Special study of training, blanching, harvesting and storing of different vegetables. One or two trips will be made to study the most successful home and school gardens of Ithaca. Laboratory fee, \$1.50.

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The Register (for the year 1919-1920, published September 1, 1920), price 50 cents.*

Samples of entrance and scholarship examination papers, price 15 cents.*

Directory of Faculty and Students, Second Term, 1920-1921, price 10 cents.*

A Guide to the Campus, price 50 cents.*

Any of the following informational pamphlets will be sent gratis and post-free on request. The date of the last edition of each is given after the title.

General Circular of Information for Prospective Students, December 15, 1920.

Announcement of the Sibley College of Mechanical Engineering and the Mechanic Arts, April 1, 1920.

Announcement of the College of Civil Engineering, February 1, 1920.

Announcement of the College of Law, May 1, 1920.

Announcement of the College of Architecture, June 15, 1920.

Announcement of the New York State College of Agriculture, June 1, 1920.

Announcement of the Winter Courses in the College of Agriculture, July 1, 1920.

Announcement of the Summer Term in Agriculture, April 15, 1920.

Program of the Fourteenth Annual Farmers' Week (February 14-19, 1921), January 1, 1921.

Announcement of the New York State Veterinary College, February 15, 1920.

Announcement of the Department of Chemistry, August 1, 1920.

Announcement of the Graduate School, February 1, 1921.

Announcement of the Summer Session, March 1, 1921.

Summary of the Work of the Associate Alumni of Cornell, April 15, 1919.

Annual Report of the President, November 1, 1920.

Pamphlets on prizes, special departmental announcements, etc.

Announcement of the Medical College may be procured by writing to the Cornell University Medical College, Ithaca, New York.

**Please make all orders payable to CORNELL UNIVERSITY.*

Correspondence concerning the Cornell University Official Publication should be addressed to

The Secretary of Cornell University,
Ithaca, New York.

